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WRITTEN EXAMINATIONS AND THEIR IMPROVEMENT

by

WALTER S. MONROE, Director

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PREFACE

During the past twenty years there have been many controversies concerning the value and place of written examinations. There have also been a number of investigations of examinations and examination "grades." Since standardized educational tests have become widely used a number of superintendents and teachers have proposed that they replace the written examinations set by teachers and other school officials. More recently some attention has been given to the improvement of written examinations by the application of certain principles of test construction.

Because of the importance of the written examination and also because a number of inquiries have been addressed to the Bureau of Educational Research, it has seemed wise to organize and publish a summary of the important ideas relating to both the criticism and the defense of examinations. To this there have been added a number of suggestions for the improvement of examinations. It is hoped that this bulletin may foster intelligent thinking relative to written examinations and their use in our schools.

Although this bulletin is largely the product of the labors of the Director of the Bureau of Educational Research it is only just that the contributions of other members of the staff should receive recognition. Both Mrs. Charles H. Johnston and Mr. Lloyd B. Souders have made substantial contributions.

WALTER S. MONROE, Director

WRITTEN EXAMINATIONS AND THEIR IMPROVEMENT.

INTRODUCTION

Basis of a Rational Estimate of the Value of Written Examinations. Until recently, examinations occupied a regular place in the work of the school. Students expected them as a matter of course, and the accuracy of the marks placed upon examination papers was not seriously questioned. However, for a number of years written examinations set by teachers and by other school officials have been subjected to criticism. During this period the defects and the limitations of examinations have been thoroughly canvassed. Many prominent educators have advised that they be abolished entirely, and in a number of school systems this has actually been done. The friends of examinations, however, have urged their merits and have insisted that the abolition of them would cause our educational system to deteriorate. The controversy has not been without prejudice on both sides. The marking of examination papers involves much drudgery for instructors. Students dislike examinations partly because they require a type of intensive mental activity which many of them prefer to avoid and partly because it is fashionable in many schools to oppose them. Conservatives, naturally, have resented any proposal to change a system of education which they credited with producing the educated men of the present generation. Some, at least, have expressed the belief that examinations have been largely responsible for the quality of the output of our public schools and colleges.

In evaluating the criticisms and the defense of written examinations it is imperative that one keep in mind the fact that they have more than one function. Written examinations are not merely measuring instruments, although this function is probably most prominent in the thinking of many persons. The written examination is used as an instrument for measuring the achievements of students, but it also affords a unique type of opportunity for learning. Under rather well defined conditions, certain tasks are set for the pupil and he is required to demonstrate within a limited time what he is able to do. He is thrown upon his own resources and forced to work under pressure. In the actual writing of his answers to the questions of the examination the pupil has an opportunity to learn. Ideas tend to become more definite as a result of expression in written form. Frequently the pupil gains new ideas as a result of the reflective thinking

he does in answering the questions. It is true that all pupils do not always learn in taking an examination, but it is also true that all pupils do not take advantage of all other educational opportunities which are offered them. In addition to the actual taking of the examination, the pupil frequently, as a preparation for it, engages in review; and, because he knows that later he must take the examination, he has a stronger motive for this review.

Not only is it important that we recognize the existence of functions other than the one of measurement, but it is also imperative that we bear in mind two distinctions. First, we must distinguish between criticisms of examinations and criticisms of certain kinds of examinations. The fact that some teachers set poor examinations does not furnish an adequate basis for concluding that all examinations should be abolished. In the second place, we should distinguish carefully between criticisms of examinations and criticisms of the ways in which they are used. Good examinations may be used for wrong purposes. For example, a good examination might be given to a pupil or a group of pupils merely as a punishment for some misbehavior. If we believe that such use is not justified it does not follow that the examination itself is subject to adverse criticism or that all examinations should be abolished.

CHAPTER I.

CRITICISMS OF WRITTEN EXAMINATIONS SET BY TEACHERS AND OTHER SCHOOL OFFICIALS

The arguments advanced for and against examinations have dealt with various phases. Some of the criticisms have emphasized the effectiveness of the examination as a measuring instrument; others have had to do with the purposes for which examinations are used by teachers and by other school officials. Some criticisms are based upon facts, while others merely represent opinions. In the following pages the most significant criticisms have been summarized and grouped under a few major heads. In presenting these criticisms there will be no attempt to point out their limitations or to present the arguments in favor of written examinations. This will be reserved until the second chapter.

1. Examinations yield inaccurate measures of achievement. A number of criticisms of written examinations set by teachers and by other school officials have referred to their effectiveness as instruments for measuring the achievements of students. These criticisms may be summarized under six heads.

A. Marking of examination papers subjective. Scientific investigation has proved that the marking of examination papers is subjective, i.e., different teachers, when working independently, tend to assign widely varying marks to the same paper. An investigation by Starch and Elliot[1] is typical of many that have been made. These investigators selected a final examination paper in geometry, written by a student in one of the largest high schools in Wisconsin. An exact reproduction of this paper and a set of the questions were sent to one hundred and eighty high schools in the North Central Association. It was requested that this paper be graded according to the practise and standards of the school by the principal teacher of mathematics. One hundred and sixteen acceptable replies were received. The papers showed evidence of having been marked with unusual care and attention. In seventy-three schools where the passing grade was 75 the lowest mark given was 39 and the highest 88. The mode was 75, with twelve teachers giving this mark. Of the one hundred and

[1]Starch, Daniel, and Elliot, E. C. "Reliability of grading high school work in mathematics," School Review, 21: 254-59, 1913.

sixteen marks assigned to this paper, two were above 90 and one was below 30. Twenty were 80 or above and twenty other marks were below 60. Forty-seven teachers assigned a mark passing or above, but sixty-nine teachers thought this paper not worthy of a passing mark.

Robert L. Morton[2] reports an investigation of the reliability of the marking of examination papers written by teachers applying for a license to teach. In 1904, the Ohio Legislature provided for uniform questions for the teachers' examination. These questions were to be prepared in the office of the State Superintendent of Public Instruction and sent to the eighty-eight county boards of examiners. Special examiners were appointed in each county to rate the papers. Morton selected an arithmetic paper from the files of one board of examiners. The paper was mimeographed, care being taken to produce exactly the language, spelling, and punctuation of the original paper. A copy of this paper, together with the questions, was sent to each of the eighty-eight county superintendents in Ohio with the request that it be graded by the special examiner for arithmetic. Replies were received from fifty-five counties. The lowest mark given to the paper was 60 and the highest 99. In marking the answer given to one question on this paper five examiners rated it at zero, twenty-one at 10, and the other twenty-nine assigned marks between these extremes. If each answer had been rated in the county assigning the lowest mark to it, the total "grade" for the paper would have been 28. On the other hand, if the highest marks assigned to the answers of the various questions had been used to make up a "grade", a mark of 100 would have been given to the paper. Morton investigated in a similar way the marking of a paper in the theory and practise of teaching and also of one in geography. Similar variations in the marks were found.

A striking illustration of the subjectivity of the marking of examination papers by college instructors is cited by a recent writer[3]. One of the group of expert readers assigned to the marking of examination papers in history, after scoring a few papers, wrote out for his own convenience what he considered model answers to the questions. By some mischance this "model" examination paper fell into the hands of another expert reader who graded it as a paper written by a student. The mark he assigned to it was below passing and, in accordance with the custom, this "model" was rated by a number of other expert readers in order to insure that it was properly marked. The marks assigned to it by these readers varied from 40 to 90.

[2]Morton, Robert L. "The examination method of licensing teachers," Educational Administration and Supervision, 6: 421, November, 1920.

[3]Wood, Ben D. "Measurement of college work," Educational Administration and Supervision, 7: 301-34, September, 1921.

Scientific investigation of the marking of examination papers has been sufficiently extensive to prove that, except in a very few instances, the process is subjective. Except for accidental errors, different teachers should assign the same mark to an examination paper in spelling. The marking should also be highly objective in arithmetic unless there is an attempt to allow partial credit for examples and problems partially right or for correct principle when the answer is not correct. The marking of the answers to questions which call for specific facts, such as dates, names of places, or persons, should approach objectivity. With the exception of these cases, the marking as it is ordinarily done is highly subjective, and hence the "grades" are inaccurate measures of achievement.

As might be expected, the degree of subjectivity varies with different school subjects. It is, however, sometimes found to be high where the nature of the subject matter leads one to expect that the marking will be relatively objective. For example, Starch and Elliot found that the marking of an examination paper in geometry was just as subjective as one in English or history. Kelly[4] found that the rating of examination papers in algebra was considerably more objective than in physics.

B. Questions of an examination not equal in difficulty, and weighting by teachers subjective. There is abundant evidence that the questions of an examination are generally not equal in difficulty. Frequently, in this respect, they vary widely. When the questions are submitted to a large number of pupils, some will be answered correctly by a large percent of the pupils, others by only a small percent. To give as much credit for answering an easy question as for a difficult one would appear to introduce serious errors into the marks assigned to the papers. Because it is recognized that the questions which make up an examination are generally unequal in difficulty, teachers frequently attempt to assign appropriate weights. For example, one question may be assigned a credit of 15 points while an easy one is given a credit of only 4 points. One investigation[5] has shown that teachers' estimates of the difficulty of questions are highly subjective. Twenty teachers were asked to arrange twenty-three problems in arithmetic in the order of their difficulty. A very wide variation in these rankings was found. One problem was considered the easiest by one teacher and ranked twenty-first in difficulty by another. The results of this investigation seem representative. That being the case, any weight-

[4]Kelly, F. J. "Teachers' marking," Teachers College, Columbia University, Contributions to Education, No. 66, 1914.

[5]Comin, Robert. "Teachers' estimates of the ability of pupils," School and Society, 3: 67-70, January 8, 1916.

ing of questions by teachers must be considered highly subjective, and hence not a satisfactory corrective for the unequal difficulty of questions.

C. Content of examinations not in agreement with educational objectives. The criticism is frequently made that teachers, in formulating examination questions, tend to ask for unimportant details and to neglect the minimum essentials of a subject, and that, therefore, a pupil's performance on an examination can not be a truthful index of the extent to which he has achieved the educational objectives set for him. Some questions are described as "catch questions." By this, it is usually meant that such questions call for some unimportant detail or that they are ambiguous in some way. There appears to have been no scientific investigation of the character of the examination questions asked of pupils. However, it is doubtless true that this criticism has justification in some cases because frequently teachers give relatively little time to the preparation of their questions, and these often reflect any hobbies or prejudices which the teachers may have. Experience in the construction of standardized educational tests has shown that it is difficult to eliminate all ambiguity and indefiniteness in questions. Hence, it is likely true that many questions are not well stated, and for this reason are not properly understood by those taking the examination. When this is the case, the "grades" tend to be inaccurate measures of achievement.

When an examination is set by some person other than the teacher of the class it not infrequently happens that many of the questions pertain to topics which have received little or no attention during the instruction periods. In many schools it seems to be the custom for the superintendent or the principal, without consultation with the teacher in charge, to make out the questions for the final examination on which the pupils' semester grades are largely based. For example, in a fifth grade geography class in an Illinois city, four of the five questions of the examination concerned current conditions about which the children, instructed only in their texts, knew little. A few pupils, fortunate enough to have heard these matters discussed in their own homes, received a passing grade. The majority of the class failed. This examination, interesting and in itself not subject to criticism, should not have been used, however, as a means for measuring the achievements of that particular class. It was not in agreement with the educational objectives toward which the teacher had directed their efforts. Such examinations are "hard" in the sense that capable students will answer only a relatively small percent of the questions correctly, and are rightly criticized as being unjust because the students are not given an opportunity to demonstrate their achievements.

D. Rate of work neglected. The usual plan is to set an examination which practically all pupils can finish in the time allowed. No record is kept of the time which the pupil has spent in writing his answers. If two pupils write papers which are considered equivalent in quality but one has completed the examination in forty minutes and the other in ninety minutes, it is not customary to distinguish between their performances. Both will receive the same "grade." This means that the rate of work is neglected. Since the rate at which a pupil is able to answer questions is one index of his ability, the ordinary examination fails in this respect to secure a truthful measure of his ability.

E. A single examination does not offer an adequate opportunity for a pupil to demonstrate his ability. Some critics urge that a single examination, even when carefully prepared and graded, will not in general yield a reliable measure of a student's ability. McAndrew[6], in reviewing the work of the New York City high schools, says, "New York City high schools use them (examinations) in deciding the promotion to the training school for teachers. We have every year some students whom their teachers have complimented regularly but who fail of graduation because of a three hour test which nullifies the work of four years. I cannot see how a pupil writing for three hours can be tested for what he has done for a year or more." Courtis[7] expresses much the same thought in the following statement: "The best examination is not that represented by the score of a single performance in a single day. Human effort is variable and human skill too easily upset to make it fair to have promotion based upon chance scores."

Thorndike[8] has summarized a number of investigations carried on at Columbia University in order to determine the reliability of the "grades" made on college entrance examinations as a basis for predicting the type of work which the student will do in college. He states that we cannot estimate the success of the student in college from his grades on entrance examinations with "enough accuracy to make the entrance examinations worth while and to prevent gross injustice being done to any individual. The record of eleven or more entrance examinations gives a less accurate prophecy of what a student will do in the latter half of his college course than does his high school record." Similar results have been obtained by

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[6]McAndrew, Wm. "Our old friend the examination," Proceedings of National Educational Association, 1916, pp. 527-33.

[7]Courtis, S. A. "Standardizing of teachers' examinations," Proceedings of National Educational Association, 1916, pp. 1078-86.

[8]Thorndike, E. L. "The future of the college entrance examination board," Educational Review, 31: 470-83, May, 1906.

other investigators.[9] Studies of this type do not necessarily prove that examination "grades" are inaccurate measures of achievement. Because of other elements which enter into college life, a student having made a satisfactory record in his secondary school may not carry on successfully his work in college.

F. Marks assigned to examination papers imply subjective norms. This criticism has to do with errors in interpreting measures of achievement yielded by examinations rather than with errors in the measures, but since examination marks are usually thought of as measures, it may be considered under this head. In reading the controversial literature on written examinations one will find little mention of the criticism expressed by the heading of this paragraph, but in the illustrations given below the reader will recognize that this weakness of examination marks has been sensed by most pupils and teachers. However, they appear to have failed to analyze the situation sufficiently to grasp the source of the difficulty. In the judgment of the writer this is one of the most serious weaknesses of the traditional examination.

In order to understand how norms (standards) are used in connection with the grading of examination papers it is necessary to distinguish between scores, or measures, and "grades," or marks. A score simply describes the performance which has been recorded in the examination paper. For example, a pupil may answer 55 per cent of the questions correctly. In this case 55 is his score. If a certain number of points or credits had been given for each question his score might be 129 or 91, or 217. A "grade" interprets this description with reference to certain norms. A "grade" indirectly describes a pupil's performance on an examination, but it also tells whether the pupil's performance is to be considered as above passing or below passing; whether he is to receive the highest mark or the lowest mark or an average mark. It is customary to describe the quality of examination papers in terms of the percent of questions answered correctly. For example, if an examination includes ten questions and a pupil answers seven of them correctly and an eighth one partially right, he is given a score of 75 per cent, which is interpreted to mean that in the judgment of the examiner he has answered the questions 75 percent correctly. School marks or "grades" are also frequently expressed in terms of percents. Sometimes they are expressed in terms of letters or other symbols, but these in turn are defined in terms of percents. For example, the grade of "A" may be defined as being between 95 percent and 100 percent.

[9]Lincoln, E. A. "Relative standing of pupils in high school and early college, and their college entrance examinations," School and Society, 5: 417-20, April 7, 1917.

Since both scores and "grades" are generally expressed in terms of percents, it is only natural that the two have been confused and that scores have been used as "grades." A good illustration of their difference came to the writer recently. An examination in mathematics was given to nearly 1000 freshmen in one of our large universities. This examination may properly be described as "hard," considering the training which the students had received. One student made a score of 100. The lowest score was 12. The average was approximately 55. From the standpoint of the distribution of scores this was a "good examination." If it had been easier, so that any considerable number of pupils received scores of 100 percent, it would have been defective. If it had been so "hard" that a considerable number of students made zero scores it would also have been defective. In both cases it would have failed to differentiate between some students who were not equal in ability. However, it is obvious that if a passing mark of 70 or 75 is adopted, it would be unjust to say that all pupils having scores below this passing mark should receive a "grade" of failure. The passing mark for this particular examination should be in the neighborhood of 40. If in this case it is desirable to have the scores represented in terms of "grades" a score of 40 should be translated into a "grade" of 70 or whatever passing mark this institution has adopted.

The recognition of this distinction between scores and "grades" enables us to indicate the way in which subjective norms are implied in "grades". A "grade" is not a pure measure or description of the pupil's performance. It is rather an interpretation of the measure of his performance with reference to certain norms. When no distinction is made and scores are used as "grades," pupils will receive high "grades" if the examination is "easy;" if it is "hard" they will receive low ones. Thus, the difficulty of the examination is one factor in establishing the norms with reference to which the scores are interpreted when they are used as "grades". Severe marking will tend to set high norms. It is only when the examination is of average or "standard" difficulty and the marking is average in severity that scores and "grades" become identical in magnitude. Since the norms are established by the difficulty of the examination and the severity of the scoring, they must be subjective. In the investigations of the marking of examination papers it was shown that teachers varied widely in their judgments concerning the worth of examination papers. There is no reason to expect that they would agree more closely in estimating the difficulty of examinations. Hence, norms which depend upon teachers' estimates of which questions are appropriate for examinations and upon their marking of the papers must be considered subjective.

2. Undesirable mental processes stimulated by examinations. A number of critics have urged that examinations—and especially the preparation for them—tend to stimulate undesirable mental processes, and that as a result a student's learning is not of the right kind. It is claimed that memory is emphasized to the exclusion of higher mental processes. Many questions call only for facts, and even in the case of those which require reasoning the student must have some facts with which to reason. He is generally asked to answer the questions without having access to his text books or to other sources of information. It is seldom that the examination provides the student with any of the facts or principles which he requires in the reasoning process. Hence, what he records upon his examination paper must be based upon his own store of information. Thus, it is undoubtedly true that examinations make heavy demands upon the memory of the pupils.

Those who have supported this criticism of examinations insist that this emphasis upon memory tends to change the child's mind into an automatic machine. The following statements are typical: "It is mere commonplace to say that in many schools the best preparation for an examination is to have in memory a vast number of details. The student may undertake the examination in such a condition of brain fatigue that he would find it difficult to solve a simple original problem; but if he has this plethoric memory of details he will succeed."[10] "The memory which gives back knowledge in the exact form in which it is received is likely to shine at examinations."[11]

In this connection it is claimed examinations place a premium upon "cramming." Since memory is emphasized it is only natural that students should engage in an intensive review of the course immediately preceding the examination period. It is a well established principle that the recency of an experience materially affects its recall. The critics of examinations insist that students who have given little attention to the work of the course during the term may write a creditable examination paper merely as a result of an intensive cramming immediately preceding the examination date.[12] Since this is true, students tend to loaf during the term and then "cram" for examinations.

When a student's learning is limited to a brief period of intensive cramming immediately preceding the examination, he will tend to forget very rapidly. In addition, he has missed the regular growth that was

[10]Monroe, Paul. Encyclopedia of Education, Vol. 2, 536-38.

[11]Schaeffer, N. C. "The unmeasurable in teaching," N. E. A. Proceedings, 51: 169-72, 1913.

[12]Hollister, H. A. High School Administration. Boston: D. C. Heath & Company, 1909.

possible during the term and has had no opportunity to organize and relate the various items of the course.

3. Examinations tend to become educational objectives. It has been charged that teachers tend to emphasize examinations in such a way that the students come to think of them as the educational objectives to be attained. Because the fear of making a low "grade" on an examination is an effective motive, teachers frequently use it. The students are reminded of approaching examinations and are warned that they will not be able to pass them unless they study certain topics. When the "grade" received upon the final examination determines the student's success in the course, it naturally follows that he will think of "passing the examination" as the objective to be attained. Sometimes students secure former examination questions or compile a list of the topics the instructor has emphasized and study these to the exclusion of other topics which may be more important. Thus, the real objectives to be attained are obscured.

4. Examinations injurious to health of students. Because of the strenuous preparation for examinations and also because of the obvious strain which accompanies the taking of an examination, a number of critics have urged that examinations are injurious to the health of students. Even students who have been faithful during the term will frequently cram for the examination because of a desire to take a high rank in their class or because of the additional credit for quality that is given in some institutions. When a student is required to write for a number of hours during a single day, as sometimes occurs, it is obvious that even under the best conditions he has expended a large amount of nervous energy.

5. Time devoted to marking of examination papers might be more profitably employed. A majority of our larger colleges and universities have recognized the fact that the marking of ordinary examination papers makes heavy demands upon the time of instructors and have provided "assistants" or "readers" who are to rate the papers. Not infrequently the examination period is dreaded by instructors as well as by students because of the drudgery involved in reading examination papers. One writer[13] has estimated that it requires approximatly three hours to construct, give, and mark an examination for an average class. A teacher will give twenty or more examinations per year. This means that each teacher devotes not less than sixty hours to the construction, giving, and marking of examinations. This estimate is conservative. Many teachers spend much more time than this. The critics of examinations have pointed out that this time might be more profitably devoted to other school activities.

[13]McCall, W. A. "New kind of school examination," Journal of Educational Research, 1: 33-46, January, 1920.

CHAPTER II.

THE DEFENSE OF WRITTEN EXAMINATIONS SET BY TEACHERS AND OTHER SCHOOL OFFICIALS

The criticisms of written examinations summarized in the preceding chapter appear to make a strong case against their use in schools. Some of the criticisms are established facts, and others corroborate our general observations. It is, however, necessary to remember that only one side of the case has been presented. Some of the criticisms are much less serious than their advocates would have us believe. Others are not fundamentally criticisms of examinations, but rather of the way in which they are used and of other phases of our school procedure. In addition, certain significant merits of examinations were not mentioned. In this chapter the criticisms set forth in Chapter I will be examined, and the defense of examinations presented. In Chapter III we shall explain certain methods of improving written examinations which tend to eliminate or greatly minimize certain defects that now exist.

1. Measurement of abilities of students necessary to high degree of school efficiency. In considering written examinations as measuring instruments, it is necessary to bear in mind that the work of the school cannot be carried on in an efficient manner without from time to time measuring the abilities of students. These measurements are essential to the organization and administration of our schools as well as to the instruction of the class room. The promotion and classification of pupils, the guidance of pupils, both educational and vocational, the supervision of instruction, and even instruction itself, cannot be most efficient unless the abilities of the pupils are measured at intervals. If these measurements are not made in one way they must be in another. If written examinations are abolished the abilities of pupils must be measured in other ways, or the efficiency of our schools will decrease.

2. Substitutes for written examinations. It has been proposed by some critics that substitutes for written examinations may be used. Standardized educational tests, teachers' estimates, and daily "grades" furnish types of information upon which the measurement of the pupil's achievement may be based. However, it would seem, for the following reasons, that such means of measuring cannot be considered as satisfactory substitutes for written examinations.

A. Standardized educational tests versus examinations. Standardized educational tests have been shown to be superior to ordinary examinations as measuring instruments, but in considering the proposal that they replace written examinations certain facts must not be overlooked. The number of satisfactory standardized educational tests is as yet very limited. In only a few school subjects, such as handwriting, spelling, arithmetic, and oral and silent reading, do we have available standardized educational tests which might be used as substitutes for written examinations set by the teacher. Even in these subjects it may happen that for some reason the teacher has emphasized certain topics and omitted or treated casually others. Furthermore, official courses of study vary widely from city to city. Standardized educational tests are of necessity confined to those topics which are uniformly taught or, at most, to those topics which are generally taught; therefore, in a particular instance there may not be available any standardized educational test which is adapted to the instruction which the class has been receiving. A teacher, however, can construct an examination which is specifically designed to measure the results of instruction given to a particular class. Thus, standardized educational tests can be used only to a limited extent as substitutes for examinations set by the teacher or by other school officials.

In this connection it is well to remember that standardized educational tests are not perfect measuring instruments. Even the best of them do not begin to approach the degree of accuracy to which we are accustomed in the measurement of physical objects. The results which they yield may involve errors so large as to distort or make entirely erroneous many of our interpretations. Thus, in considering the errors which are involved in examination "grades" we should not forget that our best instruments for measuring mental abilities are far from perfect with reference to accuracy.

B. Teachers' estimates versus examination marks. Some of the critics of examinations have insisted that experienced teachers are able to estimate the achievements of students by reason of their acquaintance with them during the term. It has been claimed that these estimates will be more truthful measures of achievement than the "grades" obtained from a written examination given at the end of the term. There is no doubt that experienced teachers can, under favorable circumstances, estimate with considerable accuracy the achievements of students. If the class is reasonably small and if the teacher has used methods of instruction which have called for frequent oral and written performances by the students and has kept a careful record of the quality of these performances through-

out the term, the estimates may be relatively accurate measures of the achievements of the students. However, there are certain limitations which should be noted.

Teachers may be unduly influenced in their estimates by the recent performances of the students. Unless careful records have been kept throughout the term, inferior performances at the beginning tend to be overshadowed and the teacher's final estimate based upon the work of the last few weeks. In case the class is a large one, the teacher does not have an adequate opportunity of becoming intimately acquainted with the students. Teachers' estimates are likely to be materially affected by personal characteristics of pupils. A pupil with a pleasing personality or one who is liked by the teacher is likely to be rated higher than one who is unattractive.

If the class work is conducted so that there is little or no written performance on the part of the students, teachers' estimates will necessarily be based almost wholly upon the oral responses which students give during the class period. Some pupils make a good showing in class when the recitation is oral, but are at a decided disadvantage when asked to record their answers in writing. Frequently this difficulty is due to the fact that they are careless in their thinking and do not have well formed ideas to express. In oral recitation they are able to make a fair showing because of personal characteristics and because of the stimulus of detailed questioning by the instructor. Furthermore, in a class discussion a bright student who has a good command of language may easily pick up ideas from other members of the class and recall items from his general experience sufficient to make a good showing. On the other hand, there are students who express themselves most effectively in writing. They may be good thinkers but a little slow in their mental processes and not clever in discussion. Thus, it is difficult or impossible for teachers to estimate accurately the real achievements of students from oral recitations alone. In classes where a large amount of written work is required, as in English composition, the teacher has an opportunity, in formulating estimates, to consider the pupil's written as well as oral performances. In such subjects, the proposal to replace written examinations by teachers' estimates based upon the work of the course has much more merit than in other subjects where there has been only a small amount of written work. But even when much daily written work is required, a written examination covering the work of the term may give additional information concerning the real achievements of some students.

C. Daily "grades" versus examination marks. It has been proposed that the best measure of a student's achievements throughout a term is furnished by the average of his daily "grades." These "grades" include teachers' estimates of pupils' performances in class, marks given for written work submitted, and "grades" earned on short quizzes. Those who favor using the average of these marks as a pupil's final grade point out that by this means we secure a measure of a pupil's achievement which depends upon the quality of his work day by day and which, furthermore, is the average of a large number of measurements. Probably no one would contend that a student's daily "grades" should not receive consideration in determining his final standing. There are, however, certain dangers in taking the average of a pupil's daily "grades" as his final mark. In the first place, if the student knows that his final mark depends only upon his daily work he is likely to study for the day alone. His daily "grade" is based upon a rather small unit of work. Furthermore, it is based upon his performance immediately after studying the assignment. Thus, a pupil's ability to organize the content of a course and his retention of it are likely to receive little consideration in making up his final mark. Of course, it is possible for a teacher to ask the student to review frequently and to summarize and organize the work of the course at the end of the term. However, it is difficult to convince students of the necessity of reviewing the work of a course if the performance on this review receives no more weight in determining the final "grades" than the performances during an equal period of time elsewhere in the course. When classes are large it is difficult to have each student recite each day, at least to a sufficient extent to furnish any basis for assigning a daily "grade." When the members of the class are called upon only occasionally it frequently happens that they prepare only those lessons upon which they think they will be questioned. Of course, a resourceful instructor can do much to discourage this practise but the fact remains that daily "grades" may not be representative samples of a student's achievements in a course. A written examination covering the work of the entire course or of a large division of it will furnish a measure of achievement which can be secured in no other way.

Conclusion: No satisfactory substitute for written examinations. Teachers' estimates and daily grades furnish certain types of measures of the achievements of pupils. In certain cases standardized educational tests can be used to secure relatively accurate measures of achievement in certain fields. However, these means of measuring cannot be considered satisfactory substitutes for written examinations. The written examina-

tion yields a type of achievement which cannot be secured through any other means. This measurement is more important for some school subjects than for others but in relatively few is one justified in abolishing the written examination as a means of measurement.

3. Inaccuracy of examination marks. In Chapter I several sources of error in examination marks were mentioned. In the case of some of these sources sufficient experimental evidence was presented to be convincing. The only way in which these sources may be eliminated or minimized is by modifying examinations. These modifications will be treated in Chapter III, but three sources of error may be commented on at this place.

A. Neglect of the rate of work not necessary. It is not necessary that the rate of work be neglected in examinations set by teachers and other school officials. It is easily possible to take into account a student's rate of work in determining the mark which he is to receive on his examination paper. One plan is to set an examination of sufficient length to keep all members of the class employed during the entire period. In marking the papers, the number of questions which the student has answered should be considered as well as the quality of his answers. Another procedure is to have each student record the time when he finishes. This record will enable the teacher to determine the amount of time devoted to answering the questions. In the measurement of handwriting and of silent reading, as well as of abilities in a number of other fields, it is extremely important that the rate of work be considered.

B. Unequal difficulty of questions not a serious defect. It does not appear that accurate measurements of the abilities of students can be secured by giving the same credit for answering an easy question as for answering a difficult one. However, investigations of this question in connection with the scoring of standardized educational tests have indicated that the errors introduced by this procedure, which appears to be illogical, are not large. After having weighted the exercises of his language and grammar tests on the basis of difficulty, Charters[1] dropped the weights because he found that the correlation between the weighted and unweighted scores was slightly over 0.90. A number of other test makers have likewise used exercises which were unequal in difficulty without assigning any weighted credits to them. A number of other tests which consist of exercises arranged in ascending order of difficulty have been

[1]Charters, W. W. "Constructing a language and grammar scale," Journal of Educational Research, 1:249–58, April, 1920.

scored by taking the number of exercises done correctly, which amounts to giving as much credit for doing an easy exercise as for doing a more difficult one.

The writer[2] has shown in the case of certain standardized educational tests that the error introduced by disregarding the inequality of the questions in scoring is not larger than the variable error of measurement due to the variability of the performances of pupils. It, therefore, seems likely that the error introduced by disregarding the unequal difficulty of the questions of an examination will not be significant in most cases. When the examination consists of as many as twenty or more questions the unequal difficulty of the questions probably can be safely disregarded. Of course, it is wise to avoid extreme variations in difficulty whenever possible. Those setting examinations should endeavor to formulate questions which do not differ widely in this respect.

There is some doubt whether the difficulty of a question can furnish a criterion for determining the amount of credit which should be given for answering it correctly. Achievements are not valuable merely because they are difficult but because of the relation which they sustain to our educational objectives. Questions which are relatively unimportant may be very difficult. In fact, lack of instruction is one reason why a question is difficult. Therefore, topics which are assigned minor places in a course of study may furnish the basis for very difficult questions, while the topics which have been emphasized because of their importance may furnish the easier questions. It is not unlikely that the best basis for weighting questions is their social importance rather than their difficulty.

C. Inaccuracy of single examination. It has been urged that a single examination cannot yield an accurate measure of the achievements of students. It is human nature to be variable in one's performances. For certain reasons students whose achievements are ordinarily high may make low "grades" on a single examination. It must therefore be admitted that many of the "grades" yielded by a single examination are likely to involve serious errors. However, in considering the significance of these errors with reference to the use of written examinations, it is necessary to distinguish between examination "grades" and final "grades." The fact that the "grade" for a single examination may be inaccurate and, hence, that a final "grade" should not be determined by a single final examination is not sufficient reason for abolishing written ex-

[2]Monroe, Walter S. "A discussion of the performances of pupils on exercises of varying difficulty," School and Society, 15:341–43, March, 1922.

aminations. It simply means that more than one written examination should be given or that other measures of achievement should be taken into consideration in determining final "grades." Teachers' estimates and daily grades should have a place. Any written tests which may be given during the term should also be given some weight. A final examination, however, deserves a place also. In some subjects it should be given more weight than in others.

4. **Examinations force students to review and organize content of course.** One of the criticisms made in Chapter I was that written examinations tended to emphasize memory and consequently to minimize the opportunities for the functioning of the higher mental processes. On the other hand, the friends of written examinations insist that they tend to produce exactly the opposite effect. They contend that final examinations have a positive value in that they tend to force students to review and to organize the content of a course. This is a very important phase of learning in many subjects. It is pointed out that the emphasis which examinations place upon memory is not undesirable. Students should learn many facts, and they should learn them with sufficient accuracy and in sufficient detail to answer most examination questions. The memorization of a considerable number of facts is to be commended. Even the intensive cramming which is deplored by many persons has educational value. If a student studies throughout the course, an intensive review and organization of the material is extremely valuable. In fact, the profit to the student is probably relatively greater for time expended in this work than for any other equal amount of time devoted to the subject. Unless carried to an extreme, cramming is undesirable only when it has not been preceded by thoughtful study. Even in this case it is better to have the student "cram" for the examination than to go through the course without engaging in any learning. Incidentally, it should be noted that the existence of "cramming" is not the fault of the examinations but of the type of instruction given and of the policy of making the student's final grade depend wholly or very largely upon his examination mark. With proper instruction and with considerable weight given to his record throughout the course, it will not be possible for a student to loaf during the term and secure a creditable final "grade" by "cramming" immediately preceding the examination. The fact that some students are able to earn high marks merely by a brief period of intensive study immediately preceding the examination is more of a reflection upon the content of the course than upon examinations. Undoubtedly, there are some students who are sufficiently brilliant to learn within a period of a few days as much

as the average student learns throughout the course; and, furthermore, it is probably true that in some of our courses relatively little is demanded of students.

It may be pointed out, also, that the extreme emphasis upon memory cited by some critics is not the fault of examinations in general but of particular types of questions. It is possible to ask questions which may be answered entirely from memory. It is also possible to ask questions which require much reasoning and organization of information.

The writing of an examination may itself be an important part of the student's learning. "There is no impression without expression." The writing of a three hour examination is undoubtedly an intensive form of expression. In case the questions are such that the reasoning and organization of information are required, the student may learn a great deal from the act of writing his answers to the questions. From this point of view, it may be urged that a student who is not required to take final examinations is deprived of an important opportunity for learning. Not infrequently students who have been "excused from examinations" in high school report that they experience a distinct handicap when they become college students.

5. Examinations furnish effective motive. Although the written examination should not be defended merely for the reason that it furnishes an effective motive, it must be admitted that this motive makes a special appeal to many pupils. In so far as possible, the pupils should be motivated by the intrinsic values of the subject matter. However, these values are frequently remote from the life of the student, and it is necessary to resort to motives which make a more immediate appeal. This point of view is effectively set forth in the following quotation: "Something in addition to merely appealing to the future motives seems necessary at times to urge along the average reader, some means whereby his future means are made comparatively more immediate. Not merely does the examination stimulate the reader generally, but it also helps to determine his specific interest and behavior. If the child feels himself compelled to give an account of what comes within the field of his perception, he will soon develop a habit of attending to that for which he will probably be held accountable. The examination, when properly applied, constantly reminds the reader that he is responsible for the mastery of what is proposed for his learning."[3]

[3]Myers, G. C. "Examinations and the learner," Educational Review, 54:274-84, June, 1917.

6. Proper use of examinations. As we have just pointed out, examinations may fulfill a very important function in the education of students. Also they may be abused. In some schools final examinations are used as a punishment. Students who attain a fixed average in their daily grades and who have not fallen below a minimum in their deportment are excused from final examinations. In such a case the examination is regarded both by teachers and students as undesirable or evil and naturally fails to fulfill its function. This practise of excusing some students from examinations is not a defensible one. The implication is that the examination is not an integral part of the school work, but merely a punishment or a last resort measuring instrument. It is probably wiser to abolish final examinations than to follow the practise of excusing students upon the basis of high daily grades and satisfactory conduct. In considering the defense of the written examination it is necessary to bear in mind that the existence of such abuses of examinations should not be interpreted as criticisms of examinations, but rather of the teachers and other school officials who use them.

7. Examinations as objectives. Examinations have been criticised because they tend to become immediate educational objectives. This is not wholly undesirable. If the examination consists of appropriate questions a pupil who studies to pass the examination will be directing his energies to appropriate ends. It is only when the examinations tend to become exclusive objectives or consist of inappropriate questions that this criticism has much force. Furthermore, it should be recognized that this criticism also is not a criticism of examinations as such, but rather of the use that is made of them by teachers and other school officials.

8. Effect of examinations upon health of students. While it is undoubtedly true that the preparation for examinations and the writing of them frequently make enormous drains on the energies of students, we have no carefully conducted investigation of the actual effect upon their health. To one who observes the enormous expenditures of time and energy which students devote to social and athletic activities, it is difficult to believe that examinations are in general more injurious to the health of students than many other activities in which they are permitted and even encouraged to engage. It is undoubtedly true that in the case of some individual students examinations make a heavier drain upon their energies than they should be asked to bear. However, here again it should be realized that this criticism is not fundamentally the criticism of examinations but rather of setting very long examinations or of placing extreme emphasis upon them by making the final "grade" depend wholly or very largely upon the examination "grade."

9. Time devoted to examinations a profitable investment. After a teacher has instructed his students to the best of his ability some will have failed to learn; some will have learned certain details but neglected others; and a few may have mastered all of the assignment. It becomes necessary at some time for each teacher to check up the work of his students, in order to know which students need supplementary or remedial instruction. Only by thus ascertaining the extent to which his students have achieved can the teacher make his instruction fit the needs of his class. For these reasons the time which is devoted to the construction of an examination, giving it, and rating the papers should be considered a legitimate expenditure of the teacher's time; in fact, in some cases it is doubtless among the most profitable of the time expenditures which the instructor makes.[4] In fact, the instructor may very profitably do more than simply rate the examination papers. In the case of students receiving low marks, their answers may be studied in order to ascertain in what ways and why they have failed. Such information will frequently be exceedingly illuminating to the instructor. This argument applies more forcibly to examinations or "tests" given at intervals throughout the course than to final examinations, but even in the latter case the instructor will frequently receive many helpful suggestions for improving his teaching.

[4]This argument applies only to a very limited extent to examinations given at the end of a course.

CHAPTER III

METHODS OF IMPROVING EXAMINATIONS

1. Increasing objectivity in marking of examination papers. The principal source of error in the "grades" assigned to examination papers is the subjectivity of the marking. This fault has been sufficiently demonstrated. It is, however, possible to increase materially the objectivity of written examinations. This may be accomplished in two ways: (1) improving the examination questions, and (2) introducing improved methods of marking examination papers.

A. Increasing the accuracy of "grades" by improving examination questions.

(1.) General Methods. The questions should be so stated that all pupils will interpret them in the same way. When a question is ambiguous the performances which different pupils give are not comparable. Pupils who are so unfortunate as to interpret a question in a way not intended by the instructor, can receive no credit for their answers unless the instructor recognizes the various interpretations. Even in this case all answers are not comparable because some are judged with reference to one interpretation and others with reference to another. A striking illustration of the difficulty of eliminating all ambiguous questions occurs in Form 7 of the Army Alpha Intelligence Test. The exercise asks the person taking the test to tell whether "cleave" and "split" mean the same or opposite. Both answers are correct because "cleave" has two meanings which are exactly opposite. Apparently this ambiguity was not detected although the test was prepared with care by well trained persons. However, in most cases, teachers will be able to avoid ambiguous exercises if they are subjected to a careful scrutiny. All questions should be so stated that they will be clearly understood.

Pupils should be given definite instructions concerning the methods of work to be employed. They should be told whether they are to work rapidly or slowly. In some cases it is advisable for the examiner to say at appropriate intervals, "It is now time to begin on question ——." Perhaps students should not be forced to comply with these directions, but they will tend to prevent an improper distribution of time over the list of questions. In questions in which pupils are asked to "discuss" or "explain" the completeness of the discussion desired should be indicated. In arithmetic pupils should be given directions concerning the form in

which their work is to appear. If it is to be copied in a particular form all should do this; if it may be left in the form used to calculate the answer all pupils should leave it in this form.

From the standpoint of securing accurate measurements it is best to set an examination which is relatively hard. If more than 10 percent of the class make perfect "grades" the examination is "too easy," i.e., it is not difficult enough to yield accurate measures of the achievements of bright pupils. Unless the class is a selected group it is not possible for more than 10 per cent of the best pupils to possess exactly the same degree of achievement. The examination should be long enough so that all pupils will be employed for practically the entire period. The examination is not only useful as a device for measuring the improvements of pupils, but also valuable as a school exercise. No pupil should be permitted to waste any of the time set aside for the examination.

(2.) **New examinations: use of questions permitting only one correct answer.** The marking of examination papers becomes subjective when the scorer is asked to exercise judgment in determining the credit to be given for the pupil's performance. In spelling, a pupil's performance is either right or wrong and our practise is to allow no credit for a performance which is not entirely correct. Thus, the marking of an examination paper in spelling is highly objective because the scorer is not asked to exercise judgment concerning the quality of the performance. A high degree of objectivity may be attained also in the operations of arithmetic by agreeing to give no credit for examples partly correct. In other subject matter fields we are accustomed to ask some questions which call for specific facts and, hence, admit of only one correct answer. It has been claimed that such questions appeal only to the pupil's memory and that they do not yield an index of his acquaintance with principles and of his ability to organize and apply his knowledge. In order to reach this phase of his education we have asked the pupil to "discuss," "tell why," "compare," etc. When a pupil is asked to formulate an answer consisting of one or more sentences it is difficult or impossible to classify the performance as either right or wrong. When scorers are asked to exercise judgment in evaluating such performances, wide differences of opinion exist. In order to overcome this subjectivity of marking, it has recently been proposed that we can measure a pupil's acquaintance with principles and ideas by means of certain types of exercises which permit of only one correct answer. Such exercises have been used in our standardized educational tests, and it is now suggested that they be used by teachers in their examinations. Four types of such exercises will be considered.

a. True-false exercises. Instead of asking the pupil to formulate an answer in response to a question, we ask him to tell whether a given statement is true or false. For example, instead of the question, "Why did the Puritans come to America in the 17th Century?" we ask whether the following statement is true or false, "The Puritans came to America in the 17th century seeking wealth." The pupils may give his answer to this true-false exercise by writing a plus sign if he considers it true and a minus sign if he considers it false. The mental processes required in answering such exercises do not appear to be the same as those which occur in answering questions of the usual type. However, experimental evidence indicates that there is a high correlation between the scores which pupils make on a true-false examination and their acquaintance with ideas and principles as determined by our ordinary examinations.

Directions for constructing a true-false examination.[1] 1. In constructing true-false exercises, one may prepare a list of statements which cover in some detail the portion of the subject on which the pupils are to be examined. After such a list has been prepared, some of the statements can easily be changed so that they are false. The untruth of a statement should not be too obvious or it will be worthless for testing. Also statements should be selected which require an acquaintance with the subject in order to determine their truth or falsity.

2. In a true-false examination some of the statements should be true and some false, and the number of true statements should approximate the number of false statements. They should be arranged so that there is no regular sequence between true statements and false statements.

3. Since the pupil can give his responses very quickly, the examination should consist of not less than 50 statements. A true-false examination of 100 statements can be given in the time usually devoted to an ordinary examination.

4. The examination should be mimeographed or printed so that each pupil will have a copy. He may give his answers in the margins of the sheets, or, if it is desired to use the same set of papers with another group of pupils, he may be given a sheet of paper on which there are numbered blanks. The pupils will then be asked to record in the blanks their answers to the corresponding exercises. A less desirable plan, which may be followed when it is not possible to secure mimeographed copies of the examination, is to read the statements to the pupils and have them record their answers in numbered blanks. The disadvantage of this plan is that

[1]Two sample true-false examinations are given in the appendix.

the pupils do not have a satisfactory opportunity to study the statements. Also the class may give some indication of the answer if a statement appeals to them as being ridiculous.

5. The pupils should be given specific directions in regard to answering exercises about which they are uncertain. One writer[2] has suggested that the pupils be instructed to guess when uncertain concerning the truth or falsity of the statement. Another writer[3] who has used this type of examination instructed the pupils as follows: "First, go through the list quickly and mark all that you know for certain, then go back and study out the harder ones. Do not guess; the chances are against you on guessing. Don't endanger your score by gambling on those questions about which you know nothing." This second procedure is probably the better.

The scoring of a true-false examination. Since only two responses are possible, it is obvious that a pupil may give a correct response as the result of chance. In order to take this possibility into account, a pupil's score on an examination of this type is the number of exercises answered correctly minus the number answered incorrectly. Exercises not attempted are not counted.

b. "Yes" and "no" exercises. These exercises are just what their name implies. Each is answered correctly by "yes" or "no." No other answers are appropriate. The administration and scoring are similar to those of the "true-false" exercises, of which they may be considered a special type.

In constructing "yes" and "no" exercises care must be taken to avoid questions for which either of the two possible answers is absurd. In such case, obviously, a correct answer will not furnish satisfactory evidence of the pupil's achievement in a school subject. Approximately the same number of exercises should call for the answer of "yes" as for "no," and they should be arranged in no regular order of sequence.

c. Recognition exercises. Exercises in which the pupil is asked to choose from a number of proposed answers have also been used to make the scoring objective. This type of question has been called the "recognition exercise." It has been used in standardized silent reading tests and in a number of our group intelligence tests, and may be illustrated by the following:

"The first president of the United States was: Christopher Columbus, Benjamin Franklin, George Washington, Thomas Jefferson."

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[2]McCall, W. A. "A new kind of school examination," Journal of Educational Research, 1: 33-46, January, 1920.

[3]Wood, Ben D. "The measurement of college work," Educational Administration and Supervision, 7: 301-34, September, 1921.

The correct answer may be indicated by an underline or by some other mark. If only one of the answers proposed may be considered correct the marking of such exercises will be highly objective.

Directions for constructing a recognition examination.[4] In constructing this type of examination none of the proposed answers should be too obviously incorrect. An exercise can yield an indication of a pupil's achievement only when he is forced to exercise judgment in determining which of the proposed answers is suitable. For example, the illustrative exercise given above would be practically worthless for testing purposes if all the names, except that of George Washington, were of persons living today or of persons who had had no connection with our national life. In applying this type of exercise to the field of arithmetic the proposed answers should include erroneous answers which pupils are inclined to give. For example, if the exercise called for the quotient of two fractions, one of the proposed answers should be the product of the fractions and another should be their sum, and perhaps another should be the fraction obtained by taking the sum of the numerator as a new numerator and the sum of the denominator for a new denominator. When the correct answer is included in a group of such answers as these, the pupil who does not know how to find the quotient of such fractions will be unable to determine the correct answer except as a matter of chance. On the other hand, if all of the answers except the correct one were integers or were so large that they were obviously incorrect, a bright pupil who knew nothing about division of fractions would be able to select the correct answer. The correct answer should not always be found in the same position; sometimes it should be first, sometimes last, and sometimes in an intermediate position. As in the case of the true-false examination, a recognition examination should consist of a large number of exercises.

Examinations of this type should be mimeographed or printed and a copy given to each pupil. He should be given definite instructions concerning the method of work to be followed. It is probably best to instruct him to work through the test rapidly, answering those exercises about which he is certain. He should then go back over the list and try the more difficult ones. Not fewer than four proposed answers should be given. When this is done the chances are slight that a pupil will give the correct answer by guessing. The pupils may be instructed to guess if they do not know, since the chance of success by guessing is slight. The pupil's score on an examination of this type may be taken as the number of exercises done correctly.

[4] A sample recognition examination is given in the appendix.

A somewhat unusual but interesting type of recognition exercise is that described as a "matching contest." In this a pupil is given two lists of statements, the first numbered 1, 2, 3, 4, 5, etc., the second marked A, B, C, D, E, etc. In the second list, there is a statement which corresponds in meaning to a statement in the first list and the pupil is to pair these statements, marking by the number of the first list the letter of the corresponding statement of the second. For example, in the exercises given below: by the date marked (5) 1898 we place the letter B to indicate the event for which that date is significant. It is difficult to construct such examinations so that they will require reasoning on the part of the student. Their most important use is in the elementary school for rapid drill in certain phases of some subjects, such as definitions in geography and grammar, etc. The following exercises, selected from the Spokane United States History Test, illustrate the use of such an examination in linking a certain date or person with the corresponding event.

1. 1846	A. Lincoln's Emancipation Proclamation.
2. 1865	B. Spanish American War.
3. 1863	C. Beginning of World War.
4. 1917	D. Declaration of Independence.
5. 1898	E. United States entered World War.
6. 1789.	F. Election of Washington as President.
7. 1792.	G. War with Mexico began.
8. 1776.	H. Invention of the cotton gin.
9. 1861.	I. Lee's surrender at Appomattox.
10. 1914.	J. Beginning of Civil War.

1. Foch	A. Destroyed Spanish fleet in Manila Bay.
2. Lincoln	B. Invented the telephone.
3. Fulton	C. Leading Confederate General.
4. Dewey	D. Wrote the Declaration of Independence.
5. Pershing	E. Invented the steamboat.
6. Bell	F. Commanded allied armies in the World War.
7. Edison	G. Was President during the Civil War.
8. Jefferson	H. Commanded American Forces in the World War.
9. Lee	I. Was Revolutionary patriot, author, and inventor.
10. Franklin	J. America's most famous inventor.

d. Completion exercises. Pupils may be asked to fill in the words omitted from statements. The following illustrates this type of exercise:

"Fill in the blanks. Revenue for paying the war debts of the states after the Revolutionary War was provided by a.....and by .....due largely to.....influence.

The slavery question in such states as should be carved from the Louisiana Territory was temporarily settled in.....by the....."

Directions for constructing completion exercises.[5] A completion exercise should be constructed so that no suggestion will be given of the correct words to be written in the blanks. Furthermore, the facts to be supplied should be important. The best plan is to prepare a list of important statements and principles covering the portion of the subject over which the pupils are to be examined and then from these statements to strike out a certain significant word or phrase. In every case, if it is possible, the words omitted should be such that only one answer will be correct. Since little writing is required of the pupils they may be asked to fill in as many as one hundred blanks.

The scoring of completion exercises is not as highly objective as in the two types mentioned above. Pupils will tend to write a variety of words in the blanks. Different words may have almost the same meaning, and frequently the scorer will be compelled to determine whether the meaning of some word is sufficiently near to that of the correct answer to justify giving the pupil credit for having answered the exercises correctly. However, by a careful selection of statements and of the omitted words, this subjectivity may be greatly minimized. For example, in the sentence, "The first Continental Congress was held in.....," only one possible word can be correct. In using completion exercises it is necessary to provide each pupil with a mimeographed or printed copy of the examination. The pupil's score is the number of blanks filled in correctly.

e. Other advantages of the "new examination." Examinations in which true-false questions and the other types of exercises described on pages 29-34 are used have been called "new examinations." Such examinations have certain advantages in addition to increasing the objectivity of the marking of the papers. There will be a large saving of time both for pupil and teacher. The pupil is called upon to do little or no

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[5]A sample completion examination is given in the Appendix.

writing in giving his answers, and he is, therefore, able to respond to a large number of exercises. The scorer will have little or no occasion to exercise judgment as he will need only to note the brief responses given by the pupils. Thus, the labor of scoring will be greatly reduced. The saving of time in the giving and scoring will more than offset any additional time that may be expended in the construction of the "new examination." Another advantage is that the examination can be made more comprehensive. It is traditional for examinations to consist of ten questions. A few are limited to a smaller number, and only occasionally do we find examinations consisting of more than ten questions. The pupils cannot write upon a large number of questions in the time allowed. Thus, the scope of traditional examinations is necessarily narrow. We have stated that true-false examinations should include not fewer than 50 exercises. Examinations consisting of completion exercises or recognition exercises should have a corresponding length. Thus, the "new examination" may be made distinctly larger in scope. Children are apt, also, to be interested in the new examinations which are distinctly different from the usual type of school exercise, and which make an appeal somewhat in the nature of a game. In being relieved of much writing, which especially in the case of young children, amounts in itself to a laborious exercise, they are probably less fatigued, and are able to devote all their energies to the process of thinking.

f. Limitations of the "new examination." It does not appear likely that the "new examination," consisting of the type of exercises we have described, should replace entirely the traditional type of examination. The "new examination" cannot be used in mathematics, except to a limited extent. It cannot be used at all in English composition. The following questions taken from Hahn's Scale for Measuring the Ability of Children in History appear to require mental processes distinctly different from those for which the "new examination" calls.

"State points of similarity between the position of the United States in 1812 and her position in 1912.

"Arrange the following events in order of cause and effect: Force Bill, the Carpetbaggers, 15th Amendment, Negro Rule in some of the Southern States, Ku Klux Klan.

"Name the presidents of the United States since 1892."

Furthermore, it is likely that pupils would miss valuable experience and training if they were not asked at times to "compare," "explain," "discuss," "define," or "tell why." This is also true of questions in which they are asked to summarize material presented on a topic or to apply

certain principles that have been presented. Hence, it is difficult to conceive of the "new examination" being a complete substitute for the traditional examination.[6]

B. Rules for marking examination papers. The marking of ordinary examination papers may be made more objective by following a few simple rules. It is advisable often to use the "sorting method." According to this procedure the papers as they are read are sorted into piles, the best ones being placed in the first pile, the next best in the second, etc. Five distributions will, in most cases, prove sufficient, but as the reading goes on, if papers are found which do not appear to belong in any of the piles, additional ones may be started. After all of the papers have been distributed they should be re-read, taking one pile at a time, and the papers in it compared with each other. If these papers do not possess approximately the same value changes in the sorting may be made. After the examiner has satisfied himself with reference to the sorting, "grades" may be assigned to the papers in the different piles. Instead of actually sorting the papers they may be marked with a symbol to indicate the distribution, i.e., mark the best papers 5, the next in quality 4, and so on. However, when this is done, the papers on which the same symbol has been placed should be brought together and re-read.

When a large number of papers are to be rated it is well to consider one question at a time. In doing this it is desirable to follow essentially the sorting method, or, at any rate, to assign marks to the answers as read. All of the papers should be read for the first question and a mark assigned it. Five seems a good number for approximately perfect answers, 3 for average, and 1 for very poor answers. The marks of 2 and 4 and even fractional numbers may be used as appropriate descriptions of quality. After the marks on this first question have been assigned, those papers which have been given the same marks may be brought together and re-read. The same procedure should be followed in reading each of the other questions. It is well to shuffle the papers in proceeding from one question to another so that the reader will not be influenced by previous marks. When the questions have all been read, the marks assigned to each paper may be totaled, and on this basis a final distribution of the papers made. Although this method may seem to require an almost prohibitive amount of time on the part of the scorer, the increased objectivity of the "grades"

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[6]In the appendix questions selected from actual examinations given in Illinois schools are listed. These questions in their demand for explanation, discussion, organization of material, exercise of judgment, etc., show that these traditional examinations call for a distinct type of ability not required by any form of the "new examination."

assigned may justify its adoption. Especially is it advised in those cases where emphasis needs to be placed on the accuracy of examination grades.

The marking of examination papers within a school system may be made more objective by formulating rules with reference to the credit to be given for certain types of answers. For example, uniform rules may be agreed upon with reference to the credit given for correct principle when the answer is wrong, the credit given for answers partially right, the penalty, if any, for misspellings, grammatical errors, and poor handwriting. In case the same examination is given by two or more teachers some specific rules may be formulated for the particular examination. If time permits, the objectivity of the marks may be increased by having the papers rated independently by two or more teachers and using the average of the marks assigned. A modification of this procedure is to have one teacher rate all of the answers to certain questions and another teacher the answers to other questions.

F. J. Kelly[7] describes an experiment which is indicative of the increase in the objectivity of the marking of examination papers when uniform rules are adopted. Six fifth-grade teachers gave the same examination in arithmetic to their pupils. Each teacher marked the papers for her own pupils but did not record the marks on the papers. The superintendent then asked a teacher, who was unusually systematic in marking examination papers, to prepare a set of rules to be followed in the marking of these papers. After she had done so, she marked all of the papers in accordance with this plan. Then the teachers who had first marked the papers marked them a second time following her plan. This provided two marks for each paper given by the classroom teacher, the first without following any systematic plan and the second given in accordance with the rules formulated. Each of these marks was compared with the mark given by the one teacher who marked all of the papers. In Table I, the six teachers are designated by the letters A, B, C, D, E, and F. The table is read as follows: When no rules were followed teacher A marked one paper 16 to 20 points lower than the "judge," one paper 7 points lower, two papers 4 points lower, two papers 2 points lower, agreed with the "judge" on one paper, etc. The differences between the marks given when the class-room teachers followed no rules and when they followed the rules formulated are very striking. In the first instance the marks assigned by the teacher agreed with those assigned by the "judge" in only 5.5 percent of the cases, while in the second instance they agreed in 63.5 percent of the

[7]Kelly, F. J. "Teachers' marks," Teachers College, Columbia University, Contributions to Education, No. 66, p. 83, 1914.

TABLE I. DISTRIBUTIONS OF DIFFERENCES BEWEEN TWO SETS OF TEACHERS' MARKS ON FIFTH-GRADE ARITHMETIC PAPERS—FIRST, WITHOUT ANY EFFORT TO UNIFY THE METHODS USED, AND SECOND, BY A COMMON STANDARD (AFTER KELLY)

RANGE OF DIFFERENCES	WITHOUT STANDARD							WITH STANDARD						
	A	B	C	D	E	F	Total	A	B	C	D	E	F	Total
21 or more	....	....	....	....	2	....	2	....	....	....	....	....	....	.....
16 to 20	1	....	....	....	1	1	3	....	....	....	....	....	....	.....
15	....	....	....	....	....	2	2	....	....	....	....	....	....	.....
14	....	....	....	....	....	1	1	....	....	....	....	....	....	.....
13	....	....	....	....	1	2	3	....	....	....	....	....	....	.....
12	....	1	....	....	1	....	2	....	....	....	....	....	....	.....
11	....	....	1	....	1	2	4	....	....	1	....	....	....	1
10	....	....	....	....	....	1	1	....	1	....	....	....	....	1
9	....	1	....	....	2	1	4	....	....	....	....	....	....	.....
8	....	....	....	1	3	1	5	....	....	....	....	....	....	.....
7	1	1	....	1	1	1	5	....	....	....	1	....	....	1
6	....	2	....	....	1	1	4	....	....	....	....	....	....	.....
5	....	1	2	1	1	2	7	....	....	....	....	....	....	.....
4	2	2	2	1	1	2	10	1	....	....	....	....	1	2
3	....	4	2	1	2	2	11	....	....	1	1	1	....	3
2	2	2	1	1	1	1	8	4	1	1	3	7	1	17
1	....	5	4	3	2	4	18	2	3	4	5	1	1	16
0	1	4	4	1	1	1	12	22	30	16	16	29	26	139
1	2	5	2	2	2	1	14	5	....	2	2	1	3	13
2	6	1	3	2	3	1	16	1	1	3	....	....	....	5
3	9	....	2	....	2	....	13	....	2	2	1	....	1	6
4	5	1	4	1	5	1	17	....	2	3	3	....	....	8
5	2	3	2	2	1	....	10	....	1	1	2	....	....	4
6	1	1	....	3	2	....	7	....	....	1	1	....	....	2
7	....	1	1	6	1	....	9	....	....	....	....	....	....	.....
8	....	2	1	2	....	1	6	....	....	....	....	....	....	.....
9	1	....	1	2	....	....	4	....	....	....	....	....	....	.....
10	1	....	....	1	....	1	3	....	....	....	....	....	....	.....
11	....	1	1	....	....	....	2	....	....	....	....	....	....	.....
12	1	....	....	1	....	1	3	....	....	....	....	....	....	.....
13	....	1	....	....	1	1	3	....	....	....	....	....	....	.....
14	....	....	....	....	....	1	1	....	....	....	....	....	....	.....
15	....	....	1	1	....	....	2	....	....	....	1	....	....	1
16 to 20	....	2	....	....	....	....	2	....	....	....	....	....	....	.....
21 or more	....	....	1	3	1	....	5	....	....	....	....	....	....	.....
Totals	35	41	35	36	39	33	219	35	41	35	36	39	33	219
Medians	+3	0	+1	+6	−1	−4	+1							

cases. This indicates a very marked increase in the objectivity of the marking of the papers.

2. Increasing the objectivity of the norms for translating examination scores into school marks. The use of examination scores, when expressed in terms of percents, as school marks, introduces errors which are as serious as the errors arising from the subjectivity of the marking of examination papers. (See page 9). For standardized educational tests we have objective norms with which to compare the scores. Since a single examination is given to only relatively few pupils, it is not possible to secure objective norms by the procedure followed in standardizing educational tests. It is, however, possible to reduce greatly the errors in school marks arising from this source. The greatest assistance in this connection will be secured by recognizing explicitly that the scores assigned to examination papers and school marks are different. Occasionally they may coincide numerically, but they are fundamentally different. When this distinction is recognized it will be possible for a teacher to introduce objective elements into the norms that are used as a basis for translating examination scores into school marks.

A teacher should first determine whether or not his class is typical. The giving of a general intelligence test will be helpful in this connection. A distribution of their I. Q.'s may be considered a very reliable index of the composition of the group. If the median I. Q. of a class is below 100 the teacher may know that he has poor pupil material. If the median I. Q. is above 100 he may know that the class consists of better pupils than the average. If there is a relatively large number of low I. Q's it may be expected that there will be an unusually large number of low "grades." Thus, by means of the intelligence quotient and in other ways, the teacher may come to know the general status of his class.

The method to be followed in translating the examination scores into school marks may be illustrated as follows: Suppose that a set of examination papers has been rated in terms of percents. The score placed upon a paper simply describes the percent of the examination which, in the judgment of the scorer, the pupil has answered correctly. The scores should then be assembled in some such way as that indicated below:

			58		
			56	69	
		47	55	69	
	35	44	55	68	75
27	34	42	52	63	74
25	32	40	50	60	70
			39		

There are 23 pupils in this class. The scores have been arranged in six groups. It would be better to make five groups if the school uses a system of five marks. The median point score is 55. If the class is an average one this median score of 55 should be translated into the median or average "grade" which the school recognizes. If the "grades" are reported in terms of percents and the passing mark is 75 the average grade will usually be approximately 85. If the class is known to possess superior ability the median score of 55 should be translated into a higher "grade." On the other hand, if the class is known to be decidedly below average in ability, 55 should be translated into a lower grade, perhaps as low as 77 or 78. In an extreme case it might be translated even into the passing grade of 75. The translation of the median score into a grade furnishes a basis for translating the other scores. In general, the scores at the lower end of the distribution will be translated into "grades" below passing. The percent of pupils who receive such "grades" will vary widely with different classes.

There is a somewhat prevalent opinion that the normal probability curve fixes the percent of pupils who should receive "grades" below the passing mark. This is a mistaken notion. The normal probability curve tells us nothing concerning the percent of pupils who should receive any "grade." It is true that from a statistical point of view there are certain divisions of the curve which are convenient. If the base line of the curve is limited to a length equal to five times the standard deviation (5σ) and this distance is divided into intervals of 1σ and perpendiculars are erected at the division points, the percent of cases falling in each division of the curve will be 7, 24, 38, 24, and 7. It has been suggested that these numbers define the percent of pupils who should receive grades of A, B, C, D, and E, respectively. Similar proposals have been made for other plans of dividing the normal probability curve.

No plan of dividing the normal probability curve can claim to be distinctly superior to any other plan. One may accept, without being inconsistent, the assumption that the "grades" for a large group of pupils should conform to the normal probability curve, and at the same time refuse to accept any particular proposed specifications as to the percent of pupils who should receive each "grade." For example, a distribution of 50 percent A's, 25 percent B's, 10 percent C's, 9 percent D's, and 6 percent F's is not necessarily inconsistent with the assumption that accurate measures of achievement tend to form a normal distribution. However, in this case, it would be necessary to define a "grade" of A as being a "grade" which means that the pupil is above average ability or, in other words, that all pupils who are average or above are given a

"grade" of A without any attempt to distinguish between their achievement. Thus a "grade" of A would represent a wide range of achievement. On the other hand, "grades" of B, C, D, and F represent narrow ranges of achievement. Thus, the different "grades" would not represent equal ranges of achievement. This, however, for certain purposes, may not be entirely undesirable.

The range of achievement which a "grade" shall represent, or, in other words, the percents of pupils who in the long run shall receive the different "grades," is a matter of school policy. This should be determined by the school. Perhaps the best way to define the range of achievement which a "grade" is to represent is in terms of the percent of pupils who, in the long run, will receive the "grade." Undoubtedly, at the present time, there is considerable variation from system to system in respect to the range of achievement that is represented by the different "grades." If a system can reach a definite agreement concerning the percent of pupils who should receive each mark a step will be taken in the direction of making objective the norms which are used in translating examination scores into school marks. If only five marks are used a school would probably not be far from the general practise if the percents of pupils receiving these "grades" were defined as 7, 24, 38, 24, and 7. However, in establishing this definition it should be distinctly recognized that it is done as a matter of school policy instead of being forced upon the school by the nature of the normal probability curve.

3. Securing closer agreement of examinations with educational objectives. One of the weaknesses of examinations set by teachers and other school officials is that questions are frequently asked which call for non-important facts or which are not in agreement with the emphasis that has been placed upon the course during the term. By creating a proper attitude toward examinations on the part of teachers much can be accomplished toward bringing the examinations into agreement with our educational objectives. One who sets an examination should try to have it include the more important points that have been taken up during the term, and should make a distinct effort to omit all points that are unimportant. In the case of a few school subjects we now have available a partial list of minimum essentials. One setting an examination may use such lists in determining the relative importance of different topics. Textbooks, also, in that they represent the judgment of experts concerning what topics are most important, are valuable guides in this connection. Those topics which are treated briefly or are obviously assigned to a place of minor importance should not be included in an examination.

CHAPTER IV

SUMMARY

1. Probably the most prominent function of the written examination is that it provides an opportunity for learning, both in the preparation for the examination and in the actual writing of it. The pupil who is not required to take examinations is missing an important part of his educational opportunities. The importance of this function, however, varies with the type of examination. Examinations which call merely for facts or in which the pupil is not required to formulate an answer consisting of several sentences offer only a limited educational opportunity. Incidentally it may be noted that this is one weakness of the "new examination."

2. A second function of written examinations is the measurement of the achievements of pupils. As we have pointed out, measurements are essential to the organization and administration of schools as well as to class-room instruction, and examinations do secure a type of information relative to the achievements of pupils which can be secured in no other way. Although written examinations possess these functions it should be remembered that it is only when examinations are properly used and not abused that the fulfillment of these functions may be expected.

3. The written examination furnishes an effective motive. It is true that some criticisms may be offered against the use of the examination to motivate the work of the school, but this use, unless carried to an extreme, is probably not harmful.

4. Final examinations have a positive value in that they call for intensive review and organization of the content of the course on the part of the student. This emphasizes an important phase of learning.

5. In certain school subjects standardized objective tests are superior to written examinations set by the teacher as instruments for measuring the achievements of pupils. Under certain conditions teachers' estimates and daily grades may be more accurate measures of achievements than can be secured by means of written examinations. However, in view of the other functions of written examinations, we are justified in asserting that in general there is no satisfactory substitute for them. The written examination is more important in some school subjects than in others, and frequently it furnishes the teacher with a type of measurement of the achievements of pupils that cannot be secured by any other

means. In addition, it is necessary to recognize that certain types of written examinations fulfill other important functions.

6. In arriving at final "grades," teachers' estimates, daily "grades," and "grades" earned on short quizzes should be combined with examination "grades." No general rule can be stated concerning the weight that should be given to each of these types of measure in arriving at final "grades." Under certain conditions and in some school subjects the final examination should receive considerable weight, perhaps as much as 50 or 60 percent. In other cases it should be given a much smaller weight.

7. Teachers should give more attention to the formulation of examination questions. Relatively unimportant topics or those which have not received emphasis during the term should be omitted. Ambiguous statements should be avoided. The questions also should be varied so that they demand different types of mental ability, memory, reasoning, organization, etc. Pupils should be given directions concerning methods of work.

8. Examinations should be long enough so that practically no pupils will finish. In this way a measure of rate of work will also be obtained.

9. The examination should be considered a part of the regular school work. A written examination has a unique educational value. Pupils who are excused from it or who are not kept occupied throughout the entire period are being deprived of an important educational opportunity.

10. A systematic procedure should be followed in marking the examination papers. Explicit rules should be formulated relative to the effect of misspelling, poor English, poor handwriting, and so forth, upon the "grade" assigned to a paper. The rule should cover also credit for correct principle and partial credit for answers partially right. The "sorting method" of marking is recommended.

11. The difference between scores and "grades" should be recognized. Objective factors should be introduced into the norms used for translating the scores into "grades."

12. The "new examination" has many advantages, among which are its increased objectivity of marking and the economy of time for both pupils and teachers. The "new examination" will undoubtedly prove useful, but its limitations must not be overlooked.

13. Traditional examinations call for the functioning of distinct types of mental ability not demanded to so great a degree in any other kind of school work, and should not, especially in the case of final examinations, be abolished, nor replaced entirely by any other form of school exercise. Teachers and pupils, more and more, should be impressed with their unique educational value.

APPENDIX

(The following "new examinations" are given for purposes of illustration. They may include several exercises which will prove unsuitable when given to pupils.)

TRUE-FALSE EXAMINATION IN PHYSIOLOGY

Prepared by

Bureau of Educational Research

University of Illinois

Name.....Boy or Girl.....

Age last birthday.....Next birthday will be.....19.....

Grade..... Date..... City..... State.....

School.....Teacher.....

Below you will find a number of statements. Some of these statements are true, others are not true. Read each statement carefully, then if it is true mark a plus (+) in the column to the right of the sentence. If the statement is not true mark a minus (−) in the column to the right.

EXAMPLES

Answers to be written here

Read the statement below very carefully.

1. **Fats will form a lasting mixture with water.**

This is not a true statement so you will place a minus (−) sign in the column
Now read the second sentence.

2. **The layer of fat just beneath the skin is more than one-tenth of an inch thick.**

This is a true statement so you will mark a plus (+) sign in the column.....
Now read the third sentence.

3. **The union of oxygen with any substance produces heat.**

This is a true statement so you will mark a plus (+) sign in the column.....
Now read the fourth sentence.

4. **Nitrogen constitutes only one-fifth of the volume of the air.**

This is a false statement so you will mark a minus (−) sign in the column....

PHYSIOLOGY

Answers to be written here

1. The kidneys vary 12 inches to 16 inches in length.
2. The external poisoning of the skin by poison ivy or sumac never results seriously.
3. A person having a good mind must necessarily have a large brain.
4. Color blindness is more prominent in men than women.
5. Plenty of fluids should be drunk at the time of eating solid food.
6. Bones are composed of animal and mineral matter.
7. The nails are hardened outer skin or epidermis.
8. The use of alcohol increases the tendency to commit crime.
9. A full grown person contains about six quarts of blood.
10. The brain is almost perfectly spherical in shape.
11. The kidneys are almost perfectly round.
12. All animals are made up of cells.
13. Substances, like glass, which permit rays of light to pass through them readily are said to be opaque.
14. The sense organs of smell are located in the lining of the cavity of the nose.
15. The skin is composed of two layers of tissue.
16. The end organs for taste occur in the mucuous membrane of the tongue.
17. To extinguish the burning clothing of a person, it is necessary to wrap him in something to exclude the air.
18. All of the interior of the spinal cord is filled with gray matter containing nerve cells.
19. The great difference in the complexion of persons is due largely to the pigment lying in the epidermis.
20. Cancer is caused by germs growing in the tissue.
21. Diptheria can be controlled by the use of Diptheria antitoxin.
22. The brain is separated into two parts or hemispheres by a great longitudinal fissure.
23. When oxygen is separated from other substances the process is called oxidation.

Answers to be written here

24. Infectious diseases are due to changed methods of work and growth on the part of cells in certain regions of the body.

25. The use of alcoholic beverages builds up the body and makes the muscles stronger.

26. The great majority of grown people have been infected with tuberculosis germs.

27. The sense organs are the terminations of the sensory nerves serving to carry impressions to the spinal cord or brain.

28. Farsightedness is often caused by a blow on the eye.

29. An antiseptic is a substance which merely restrains the germs from growing.

30. The brain is in communication with the rest of the body by means of nerves.

31. The cerebrum is the path of communication between the nerves supplying the arms, trunk, legs, and brain.

32. The chief function of muscles is to hold up the body.

33. All milk contains bacteria.

34. The alcohol used in drinks is produced by the growth of yeast in a liquid containing sugar.

35. Our blood contains white corpuscles which destroy disease germs.

36. More people die daily from diptheria than from tuberculosis.

37. The use of tobacco increases the strength of the muscles.

38. The use of tobacco makes the nerve cells function more keenly.

39. The chewing of dry bread aids the digestion as much as the use of gum.

40. Air is composed chiefly of two gases, oxygen and nitrogen.

41. The first step in treating a person who has been poisoned is to give an emetic.

42. Light is produced by waves of a substance called ether.

43. Non-infectious diseases are caused by small plants or animals called parasites feeding upon the human body.

44. Alcoholic beverages have great value in curing disease.

45. A drink of alcoholic beverage in the winter time causes a man's body to become warm.

	Answers to be written here
46. Each portion of the brain has its own definite work to perform.	
47. Fainting is caused by an over-sufficient supply of blood being sent to the brain.	
48. The spinal cord may act independently of the brain and produce many of the muscular movements necessary in routine work.	
49. The germs of typhoid fever usually gain access to the body by being breathed in with air.	
50. Narcotics are substances which cause any organs of the body to act more vigorously than is their custom.	

Directions to teachers: After the four examples have been studied by the pupils, read the following directions to them: "On the next page you will find a number of statements similar to the ones you have just read. You are to place a plus sign or a minus sign in the column to the right of each statement just as has been done on the first page. Mark all of the statements that you are sure you can answer correctly. If you find a statement that you are not sure you can answer correctly, study it carefully and then mark the answer you think will be correct. If you find a statement you know nothing about, make no attempt to mark it, as guessing counts heavily against you. You will have 25 minutes for the test. I shall expect you to stop promptly and turn your folders face down on the desk when I tell you to do so. Ready-Go."

In computing the score of each pupil on a test subtract the total number of wrong answers from the total number of right answers. Such scores are called "point-scores." In interpreting them it is advisable to form a distribution which will show how many pupils received each score. From the distribution it is possible to work out a basis for translating the point scores into the usual kind of school marks.

Note: The "Directions to teachers" given above would not appear on the usual printed examinations. They are placed here for the convenience of teachers.

TRUE-FALSE EXAMINATION IN HISTORY AND CIVIL GOVERNMENT

Prepared by
Bureau of Educational Research
University of Illinois

Name.....Boy or Girl.....

Age last birthday.....Next birthday will be.....19.....

Grade.....Date.....City.....State.....

School.....Teacher.....

Below you will find a number of statements. Some of these statements are true, others are not true. Read each statement carefully, then if it is true mark a plus (+) in the column to the right of the sentence. If the statement is not true mark a minus (—) in the column to the right.

Directions to Teachers: Unless the students are familiar with the True-false Examination, explain the procedure to them by using four examples as given in the Examination in Physiology, Appendix, p. 44; Time allowance for this examination, 37 minutes. See also **Directions to teachers**, Appendix, p. 47.

	Answers to be written here
1. During Jackson's time the national convention method of nominating presidential candidates was introduced.	
2. The Constitution was gladly accepted by all of the people.	
3. Jefferson was the second president of the U. S.	
4. John C. Calhoun was a strong advocate of the doctrine of "Nullification."	
5. Throughout the Revolutionary War the American navy was superior to that of England.	
6. The reconstruction period following the World War was a very troublesome one in the U. S.	
7. During the first two years of the Civil War the confederate troops won the majority of the victories.	
8. England removed all the taxes against which the colonists rebelled.	

Answers to be written here

9. Scientific farming in the U. S. was little thought of before 1860.
10. France entered the World War to save Russia.
11. Robert E. Lee, leader of the Confederate forces, was one of the greatest soldiers of the Civil War.
12. In the war of 1793 between France and England, the U. S. sided with France.
13. In the battle with the English warship "Serapis," the flagship of Paul Jones, the "Bon Homme Richard," was completely destroyed.
14. President Hayes was elected over his rival candidate by an overwhelming majority.
15. The Federal Reserve Act of 1913 exercises an important effect in preventing money crises.
16. During Monroe's presidency there was more internal strife and turmoil than during any previous period since the Revolution.
17. John Brown's Raid at Harper's Ferry brought many non-slave-holders to the side of the slave-holders.
18. Russia entered the World War to protect Serbia.
19. The Lincoln-Douglas debates won Lincoln the Illinois senatorship over Douglas.
20. In ten years the tolls and revenues from the Erie Canal repaid the entire amount spent during the eight years of its construction.
21. During the period of reconstruction following the Civil War, Congress passed laws prohibiting the negroes from voting.
22. The issue of Wilson's second campaign was the keeping of the U. S. out of war.
23. At the end of the Spanish-American war, Spain turned Cuba over to the U. S. as a colony and paid us $20,000,000.
24. Many important inventions were made between 1830-1860.
25. Washington Irving was the first great American poet.
26. During the revolution the population of the United States increased.
27. John J. Pershing, U. S. General, was put in supreme command of all of the allied forces during the World War.
28. Andrew Jackson was one of the most cultured of our presidents.
29. The Missouri Compromise prevented slavery in all of the Louisiana territory north of $36^{\circ}\ 30'$, except in Missouri.

Answers to be written here

30. At the battle of Manila Bay, a German fleet would have helped the Spaniards had not the Admiral of a British fleet warned the Germans not to interfere.

31. The Dred Scott Decision meant that negroes could not become citizens.

32. England entered the World War because the German fleet bombarded English coastal towns.

33. In tilling the soil, the farmers at first were afraid to use a cast-iron plow, saying that it poisoned the soil.

34. The English government sent American cotton manufacturers copies of the spinning jenny soon after its invention.

35. In the final battle of the Texas rebellion against Mexico, the Mexicans were outnumbered two to one.

36. The early colonists believed in witchcraft.

37. General Braddock's army saved Washington and his Virginian troops from an Indian massacre.

38. Georgia was populated by people who had been thrown into jail for debt.

39. William Pitt, as prime minister of England, was a great aid to the colonists in driving the French from the Atlantic coastal region.

40. In the war of 1812, the Americans won many brilliant victories on the sea.

41. Lincoln was killed in a battle during the Civil War.

42. Washington belonged to the Federalist party.

43. The Referendum is a process of obtaining legislation which the people desire, in spite of an unwilling legislature.

44. From 1830-1860 the population of the U. S. doubled.

45. John Adams was the first president to be inaugurated in the city of Washington.

46. During the colonial period books were plentiful.

47. The British encouraged the Indians to kill American settlers who moved into the Northwest Territory.

48. Manufacturing was the important industry from the time of the Revolution down to Jackson's time.

49. The battle of Gettysburg was the only battle of the Civil War fought on northern soil.

Answers to be written here

50. The Initiative is a process of preventing legislation which a legislature would impose upon the people.
51. James Fenimore Cooper was the first American author to receive recognition in Europe.
52. The South, after all of the states had seceded, had more men for soldiers than the North.
53. England was not as kind to her colonies as the other European nations.
54. The battle ship Maine was sunk in the harbor of Havana by a torpedo fired from a Spanish warship.
55. At the close of the Mexican war, Mexico was forced to pay the U. S. $100,000,000 and to pay claims of $3,500,000 which American citizens had against her.
56. The presidential message sometimes has great influence upon Congress.
57. During the administration of President Hayes much bitter feeling arose between the North and the South.
58. Lincoln accepted the presidency with the determination to forever wipe out slavery.
59. The annexation of Texas led directly to war with Mexico.
60. William Lloyd Garrison was a violent anti-abolitionist.
61. During the period from 1750-1800 the steamboat was the main means of travel where streams were available.
62. Many northern people opposed Lincoln's reelection.
63. John Adams was the second president of the U. S.
64. One result of the war of 1812 was to stimulate manufacturing in New England.
65. Madison was very much opposed to Jefferson's policies.
66. The battle of Gettysburg was the turning point in the Civil War.
67. The spoils system has been very beneficial to this country.
68. Jay's treaty with England was much opposed in the U. S.
69. The underground railroad was a railroad used to carry cotton from the south to the mills of New England.
70. John Quincy Adams possessed the characteristics of an ideal president.
71. The beginning of the westward movement was during the administration of John Quincy Adams.
72. Washington was inaugurated in New York City.
73. During the latter part of the 18th century the U. S. was carrying on trade with China.
74. The war with Mexico lasted over three years.
75. Lincoln declared war on the southern states to make them give up slavery.

TRUE-FALSE EXAMINATION IN GEOGRAPHY

Prepared by
Bureau of Educational Research
University of Illinois

Name.....Boy or girl.....

Age last birthday.....Next birthday will be.....19.....

Grade.....Date.....City.....State.....

School.....Teacher.... .....

Below you will find a number of statements. Some of these statements are true, others are not true. Read each statement carefully, then if it is true mark a plus (+) in the column to the right of the sentence. If the statement is not true mark a minus (−) in the column to the right.

Directions to teachers: Unless the students are familiar with the True-False Examination, explain the procedure to them by using four examples as given in the Examination in Physiology, Appendix, p. 44. Time allowance for this examination, 40 minutes. See also **Directions to teachers,** Appendix, p. 47

		Answers to be written here
1.	Agriculture is the principal industry of France.	
2.	Every portion of South America has a very warm climate during all seasons of the year.	
3.	The lumber resources of India have been little developed.	
4.	Very little rain falls in the vicinity of the equator.	
5.	In the forests of South America are found many fierce, wild animals.	
6.	China is governed by a republican form of government.	
7.	Trees prevent rain water from running rapidly off the land.	
8.	The main industry of Australia is manufacturing.	
9.	Russia in Europe has many good harbors.	
10.	Many Europeans have settled in Central Africa.	
11.	Switzerland has large coal and mineral deposits.	
12.	Argentina is one of the more backward of South American countries.	

Answers to be written here

13. There is not a great variation in the amount of rainfall which is received by different sections of Europe in a year.

14. People who live in a warm climate are not as industrious as those who live in a temperate climate.

15. At the time of the arrival of Columbus the natives of South America were all in the lower stages of barbarism.

16. Manufacturing is an important industry in Germany.

17. When Columbus discovered South America it was inhabited by both red and white men.

18. London is the largest city in the world.

19. The coast of Australia is very regular.

20. The population of Great Britain is nearly one-half as great as that of the entire U. S.

21. Africa has two deserts, one north and one south of the equator.

22. Belgium, though smaller, has more people than Holland.

23. France produces more coal than the British Isles.

24. Much of the Netherlands lies below sea level.

25. The work done by the Great Ice Sheet was a hindrance to the further development of our country.

26. Very little mining is carried on in Spain and Portugal.

27. China has the largest number of inhabitants of any country in the world.

28. Before the time of Christ, Greece was one of the most backward and barbaric countries of the world.

29. Asia has much the same climate throughout.

30. Corn is the principal food of the Japanese people.

31. The Brazilian forests produce many valuable products.

32. The Mississippi Valley is the most extensive farming section in the United States.

33. Italy has many very valuable mineral deposits.

34. The plains of Russia are populated by many different peoples.

35. Agriculture is the principal industry of Belgium.

36. In early times the Chinese led the world in the matter of civilization.

Answers to be written here

37. In early historical times, the Mississippi river was longer than it is now.
38. The people of Spain and Portugal are very backward.
39. The majority of the Asiatic people belong to the yellow race.
40. Europe has the most regular coast of all the continents.
41. All of Australia has a very heavy rainfall.
42. Chile is one of the great copper-producing countries of the world.
43. Manufacturing is the principal industry of South Africa.
44. China has more inhabitants than all European countries taken together.
45. Vegetable and fruit growing is extensively followed on the Coastal Plains.
46. Brazil is smaller than the United States.
47. Agriculture is the principal industry of Switzerland.
48. All of the territory covered by Spain and Portugal has abundant rainfall.
49. The French, attracted by the discovery of rich deposits of gold and silver, seized almost all of South America.
50. Our present population is over 150,000,000.
51. The principal industry of Venezuela is mining.
52. Very few forests are found in European Russia.
53. Some parts of the German Empire are too arid for agriculture.
54. South America is quite like North America in its surface features.
55. Many manufacturing industries have been established along the western coast of the United States.
56. Africa is governed by many different nations.
57. Chile is one of the least progressive nations in S. A.
58. Great Britain has more manufacturing than any other nation.
59. Europe should not be called a continent.
60. Very little agriculture is carried on in Argentina.
61. Much of the coast of South America has been sinking.
62. Australia is larger than the U. S.
63. Irrigation is little practised in the western states.
64. Great Britain has a greater foreign trade than any other nation of the earth.

Answers to be written here

65. Very little manufacturing is carried on in Greece.

66. Little agriculture is carried on in Uruguay and Paraguay.

67. The discovery of gold in Australia led to the development of that country's resources.

68. Commerce in Holland is highly developed.

69. Irrigation is extensively developed in India.

70. Agriculture is the principal industry in Italy.

71. Most of Russia is a level plain.

72. Egypt is now governed by the Turks.

73. The Chinese cities are very crowded.

74. Most of the Asiatic people are either Brahmans or Buddhists.

75. The government of Great Britain is a limited monarchy.

76. The Nile river flows across the desert.

77. The Delaware Water Gap is in Pennsylvania.

78. Commercially, Italy occupies a very favorable position.

79. Many more animals have their homes on land than in the sea.

80. The principal occupation of Greece is coal mining.

81. Grain farming is the principal industry of Rumania and Bulgaria.

82. More than half of Europe is an extensive lowland.

83. More than one-third of our population is made up of foreigners and and negroes.

84. Animal life is found in great abundance throughout South America.

85. Ireland is mainly a country of farms.

86. The roads and railways of Switzerland are very poor.

87. The population of North America exceeds 200,000,000 people.

88. The Sahara desert is practically as large as the U. S.

89. Wheat is the main crop in the Valley of the Red River of the North.

90. Mount Vesuvius, in Italy, is constantly in eruption.

91. In some places the Amazon river is several miles wide.

92. The Japanese people have been very quick to learn the lessons of western civilization.

Answers to be written here

93. Uruguay and Paraguay are very mountainous countries.

94. Very little manufacturing is carried on in the Middle Atlantic States.

95. The Tropical Andean Countries are among the most important mineral producing regions of the world.

96. The principal food of the Chinese is corn.

97. All of Africa is populated by the negroes.

98. Much of the surface of Japan is mountainous.

99. The people of Asia have always been very backward.

100. The government of Japan is an absolute monarchy.

COMPLETION EXAMINATION IN AMERICAN GOVERNMENT

Prepared by
Bureau of Educational Research
University of Illinois

Name.....Boy or Girl.....

Age last birthday.....Next birthday will be.....19.....

Grade.....Date.....City.....State.....

School.....Teacher.....

Below you will find a number of statements. In each statement one or more important words have been omitted. Each blank in the sentence shows where a word has been left out. Read each statement carefully, then write in the blank the word which completes the meaning of the statement. You will be allowed 15 minutes for the test.

1. The primary purpose for which government exists is the.....of our lives and property.
2. Citizenship may be acquired by.....in this country or by a process of .....for natives of other lands.
3. Our national government derives its authority from the.....of the United States through our national.....
4. The legislative power granted to the national government is vested in a Congress of .....houses, the smaller of which is called the.....and the larger the.....
5. The execution of the laws made by.....is intrusted to the..... of the United States.
6. All judges connected with the national courts are appointed for life with the consent of.....
7. Most of the candidates for office which are filled by popular vote are nominated directly in.....
8. The Fifteenth Amendment of the United States Constitution prevents the states from denying to citizens the right to vote on account of....., ..., or previous condition of.....

9. Practically all of our law-making bodies are made up of.....chosen for short terms from.....into which the states, counties and cities are divided.
10. The first permanent English settlements in America were made in what is now the state of.....
11. In a county, the records of the county board and other official papers are preserved by the county.....
12. All cities are public corporations created under.....municipal laws.
13. Every incorporated city obtains from the.....government a..... under which it may elect its officials and conduct its business.
14. Civil service employees may be removed from service only for.....
15. The power of impeaching a state officer is given to the.....
16. The.....is by far the most prominent and powerful executive official in the state. Very.....state officers are appointed by him or are responsible to him.
17. All important officials connected with the executive or judicial service of the United States may be removed by.....through the lower house of Congress and by.....in the senate.
18. Far more property is destroyed by.....than by all other agencies.
19. There is no task of state and local government which outranks in importance that of providing an.....education at public expense.
20. All rivers and canals within a single state are controlled by the..... in which they are located.
21. Most of the revenue for state and local governments is secured by a..... on.....
22. A state.....is the fundamental law which the people of the state have arranged for their government and protection.
23. A state constitution can be changed by means of an.....
24. The three-fifths compromise provided that five.....should be counted as equal to three.....when reckoning the.....for either direct taxation or representation.

RECOGNITION EXAMINATION IN ALGEBRA

Prepared by
Bureau of Educational Research
University of Illinois

Name.....Boy or girl.....

Age last birthday.....Next birthday will be.....19....

Grade.....Date.....City.....State.....

School.....Teacher.....

Below you will find a number of statements. In each statement a word or number has been omitted. At the close of the statement several words or numbers have been given. One of these is the correct answer. Select the word or number which you think is correct and draw a line under it. Most, if not all, of the examples can be solved by mental calculation. If any figuring is necessary, work on the margin of the page. You will be allowed 17 minutes for the test.

1. Numbers that are represented by letters are called.....numbers.
   substituted—literal

2. When two or more letters are multiplied together each is called a.....
   of the product. factor—coefficient

3. If a man rides a certain distance in 10 hours, in h hours he rides.....

   $10h; \frac{h}{10}; \frac{10}{h}$

4. The statement $2x+5=29$ is called an..... identity—equation.

5. If 16 is substracted from three times a certain number the result is 110. The number is..... 36 2/3; 31 1/3; 42.

6. A number which is a factor of two or more numbers is called a.....factor.
   common—equal

7. If there are two equal factors of a number, either is called the.....of the number. square root—common factor.

8. To multiply algebraic fractions take the.....of the numerators for a new numerator and the product of the denominators for a new denominator.
   sum—product

9. A fraction whose numerator or denominator (or both) contains fractions is called a .....fraction. multiple—complex

10. A .....is a statement of a fact which is to be proved. theorem—axiom.

11. The name given the + sign is..... negative—positive

12. To find the sum of two numbers whose signs are opposite, take their..... regarding each as positive, and prefix the sign of the larger number to the answer. sum—difference—product

13. Whenever a number occurs without a sign, the.....sign is to be understood. X; +; −

14. The number denoting the power of a term is called the..... prefix—exponent

15. If a = 2, b = −3 and c = −5 then $\frac{2abc}{a}$ =..... −6; −2; 30

16. In adding like terms add the coefficients for the new coefficient and..... it by the common factor. multiply—divide.

17. An expression which contains more than one term is called a..... monomial—polynomial

18. If the length of a rectangle = 4 feet more than twice the width, the perimeter = 56 feet. The length = ...feet. 8—12—16

19. Any term may be transposed from one side of an equation to the other, provided its .....is changed. sign—value.

20. Any equation which contains no higher power of the unknown letter than the first is called a.....equation. radical—simple.

21. The exponent of the product of two powers of the same number is equal to the .....of the exponents of the factors. product—sum

22. To raise the product of two numbers to any power, raise the numbers separately to that power and take their..... product—sum

23. The square of any two numbers is equal to the square of the first number..... twice the product of the two plus the square of the second number. plus—minus

24. A 20 foot ladder rests against a building, the bottom of the ladder being 12 feet from the cellar wall. The top is.....feet from the ground. 8-16

25. In division, the sign of the quotient is.....whenever the dividend and divisor have like signs. −; +

26. In finding the quotient of two powers of the same number the exponent of the quotient is equal to the exponent of the dividend.....by that of the divisor. increased—diminished.

27. $(3x^2-2x-1)\div(x-1)=$..... $3x+1; 3x-1$.

28. A factor which has no factor except itself and unity is called a.....factor. prime—multiple

29. The product of all the common prime factors of two or more numbers or expressions is called their.....common factor. highest—lowest.

30. If one number is exactly divisible by another, the first is called a.....of the second. Divisor—multiple

31. In algebraic fractions the dividend is called the..... denominator—numerator

EXAMPLES OF TRADITIONAL EXAMINATIONS

At the request of the Director of the Bureau of Educational Research, a number of superintendents and high-school principals in Illinois sent copies of final examinations which were being given in their schools during the year 1921-1922. The following list of questions has been selected from the large number submitted. These questions, although the selection was made on the basis of the judgment of one person only, seem among the best examples of the traditional type of examination. In that they demand explanation, discussion, organization of material, exercise of judgment, etc., on the part of the pupil, they call for a distinct type of ability not required by any form of the "new examination." In making this selection the different school subjects and the different grades both of the elementary and of the high school have been represented to as great a degree as possible. In the lower grades of the elementary school the majority of the questions submitted were based upon memory and could easily have been changed into some form of the "new examination." For that reason, no examinations from those grades are included in this selection.

HISTORY

(Seventh grade)

1. What was the purpose of Columbus' voyage and its result?
2. What did ten of the following explore or discover: Cabot, Balboa, Ponce de Leon, Magellan, Coronado, De Soto, Drake, Hudson, Cartier, Champlain, LaSalle.
3. What people settled Jamestown, Virginia? Discuss one of the following topics in connection with Virginia history.
   The Starving Time, Individual Ownership, Tobacco Raising.
4. Tell by what class of people and why was each of the following states settled: Maryland, Carolina, Georgia.
5. Tell the story of William Penn, naming the colony he founded.
6. Why did the Pilgrims come to America? Where did they land? Write of their first winter in America and their relations with the Indians.
7. Tell what happened in 1492, 1607, 1619, 1620, from 1519 to 1522.
8. For what nation and on what errand did Joliet come to the Illinois country? Why did Marquette come with him?
9. Tell the story of Starved Rock. What tribes of Indians were connected with it and how?
10. Write an item of historical interest about each of five: Tonti, Stuyvesant, Oglethorpe, Baltimore, Bacon, Bradford.
11. Write a short paragraph about two of the following:

    1. Illinois pioneers.
    2. Illinois rangers.
    3. Block houses.
    4. Keel boats.

HISTORY

(Seventh grade)

1. What were the results of the Revolutionary War?
2. Explain in what ways Congress was weak under the Articles of Confederation.
3. Who was Lafayette? What did he do for American liberty? Why?
4. What was the Ordinance of 1787?
5. A convention of delegates from the states was called to meet in Philadelphia in May, 1787. Why?
6. Who was the first President of the U. S. under the Constitution? When and where was he inaugurated?
7. Name and tell how important inventions have helped the progress of the U. S.
8. Why was the purchase of Louisiana an important event for the U. S?
9. What was the result of the War of 1812?
10. Tell something of the work of the Humanitarians and the establishment of the free elementary schools.

HISTORY

(Eighth grade)

1. Discuss five powers or duties of Congress.
2. Name the officers of the President's cabinet and a duty of each.
3. Explain the need of a survey system. Make a diagram showing baseline, principal meridian, township lines, range of townships. Locate Twp. 2 N. R. 3 E of P. M.
4. How were ten of the following connected with the Civil War: Stonewall Jackson, Major Anderson, Robert E. Lee, Jefferson Davis, McClellan, Hooker, Grant, Sherman, Emancipation Proclamation, Hammering Campaign, Gettysburg, and Appomattox Court House.
5. Tell the location, time, inventor, and importance of the Atlantic Cable.
6. Tell of two good results of the Civil Service Reform.
7. Name and discuss two famous laws we have studied this semester.
8. Write a brief paragraph discussing the importances of the Pan-American Congresses.
9. Give the time, place, purpose and importance of an exposition studied this semester.
10. State two causes and two results of the Spanish-American War.
11. Write a statement about each in connection with the World War: Autocracy; "der Tag;' submarine; Lusitania; armistice.

HISTORY

(High school)

1. Discuss the work of Spain in exploration—naming five important explorers.
2. State the Mercantile Theory of trade and explain its effects during the American colonial period.

3. State five defects in the Articles of Confederation. How were these defects remedied in the Constitution?
4. What was the Northwest Ordinance of 1787? Why important?
5. Explain Alexander Hamilton's policy on the U. S. debt.
6. Give the history of the Nullification Controversy of 1828-33.
7. Give the history of the election of 1823.
8. Identify the following: Gallatin; Oglethorpe; DeWitt Clinton; Thos. Paine; Stephen Decatur.
9. Explain three important results of the war of 1812.
10. Discuss the political platform and policies of President Jefferson.

ANCIENT HISTORY

(High school)

1. (a) Name and explain the sources of historical information.
   (b) Name each of the Oriental nations in the order of their development. State what was done by each for civilization.
2. (a) What were the causes of Greek colonization? What relation did the Greek colony have to the mother city?
   (b) Locate the chief centers of colonization and state for what each was famous.
3. (a) Trace out the history of the ancient Hebrew people and explain their service to humanity.
   (b) Describe the government and customs of the Spartans.
4. (a) Explain the origin, growth, and effect of the Delian Confederacy on Greek history. Show how it changed into the Athenian Empire.
   (b) Describe Athens in the time of Pericles.
   (c) Describe the intellectual greatness of Athens in the time of Pericles.
5. (a) Identify the following men and account for their greatness.
   1. Alexander
   2. Themistocles
   3. Aristides
   4. Plato
   5. Socrates.
   (b) Give an account of the invasion of Greece by Xerxes during the Persian Wars. Name important battles and tell in detail about one.
6. (a) What did Philip of Macedon accomplish for Macedonia?
   (b) Trace the march of Alexander against the Persians.
7. (a) Why was Europe better fitted than Asia to develop the highest civilization?
   (b) What mountain systems of Europe are not off-shoots from the central mass of the Alps?

GRAMMAR

(Eighth grade)

Answer ten questions.

1. Of what value is a good vocabulary?
2. How can a person acquire a good command of words?
3. What is an antonym? Write five words and give their antonyms.
4. Define synonym. Write five words and give their synonyms.
5. Define verb. A verb phrase.
6. Write a stanza of the Star Spangled Banner. Punctuate correctly and underline the verbs and verb phrases.
7. Define transitive verb. A direct object. Write a sentence containing a transitive verb and a direct object.
8. Name the eight parts of speech.
9. A boy is flying a kite.
   A crow is flying over the cornfield.
   Are the verbs in the above sentences transitive or intransitive? Why?
10. Use the verbs, lie and lay, sit and set, correctly in sentences.
11. Classify the nouns and verbs as to number in the following:
    a. They came
    b. We come
    c. We have come
    d. We had come
    e. The house will be built.
    f. The horses were running
    g. They have been seen
    h. We saw
12. What is a participle? Underline and give the grammatical construction of the participle in the following sentence:
    Crossing the street, I lost my hat.
13. What are the distinguishing marks of a verbal noun?
14. Give the construction of the verbal nouns in the following sentences:
    a. To obey is a cardinal virtue.
    b. Most boys like to play basketball.
    c. Playing baseball is hard work.
    d. I enjoy hearing pupils read.
15. Name and define the tenses. Tabulate the tenses of the verb "call."

ENGLISH

(High school, 1st year)

1. (a) In comparison with other languages is English old or new?
   (b) Why is the study of Latin important to us?
   (c) Give an example of a word derived from Latin and explain its parts.
   (d) Explain by illustration the use of a *prefix*.
   (e) Define literally: irregular—international.

2. (a) Explain the value of good pronunciation.
   (b) List 5 words that you have been mispronouncing.
   (c) Punctuation aids one in what way?
   (d) Illustrate the use of *one* punctuation mark.
   (e) State and illustrate the simple rule of spelling in regard to *ei* and *ie*.

3. (a) Name the 8 parts of speech. Illustrate.
   (b) Why should one make a good choice of words in writing or speaking?
   (c) Write an exclamatory sentence.
   (d) Give the plurals of: *datum, radius, lady, alumna, monkey, index, oasis, cargo, solo, volcano.*
   (e) Give feminine of: *abbot, hero, wizard, sir, lord.*

4. (a) How would you distinguish poetry from prose?
   (b) Give an example of *rhyme.*
   (c) Name 3 poetic qualities of Ancient Mariner? Illustrate.
   (d) Quote your favorite stanza from the poem, Ancient Mariner.
   (e) Name two descriptive passages from Vision of Sir Launfal.

5. (a) What is the purpose of the drama?
   (b) Name and give the dates of our greatest English dramatist.
   (c) Is "The Merchant" tragedy or comedy? Why?
   (d) Name the 4 stories which make up the plot.
   (c) Quote 3 passages from the play.
   (d) What is the climax of the play? Explain why.
   (e) Give setting of the story. Its source.

6. (a) Describe the theatre of Shakespeare's time, or characterize Shylock carefully, illustrating your points.

ENGLISH

(High school)

Answer ten questions.

1. (a) Discuss the work of three colonial prose writers.
   (b) Discuss the work of two colonial poets.

2. (a) What were the general tendencies of the literature of the Revolution?
   (b) Discuss the works of two writers who were closely connected with governmental affairs.

3. Who was the first American novelist? Tell about his works and characteristics as a writer.

4. (a) Give five important facts concerning the life of Irving.
   (b) Write in outline form a classification of Irving's works.

5. Give a detailed account of the life of your favorite American poet.

6. (a) Name three striking characteristics of the poetry of each of the six great American poets.
   (b) Name two of the best poems of each.

7. (a) Give five facts concerning the life of Poe.
   (b) Give ten striking characteristics of his work.

8. (a) Discuss the prose of Emerson, Lowell, and Holmes.
   (b) Quote two epigrams from Emerson's essays.
9. Write a paragraph on the subject—Thoreau's Individualism.
10. For what were the following noted: Walt Whitman, John Motley, Joel Barlow, Timothy Dwight, Francis Parkman, Thomas Bailey Aldrich, William Dean Howells, Bret Harte, Bayard Taylor, Sidney Lanier.
11. Name the authors of the following: Tales of a Wayside Inn, Commemoration Ode, The Prairie, The Prince of Parthia, Laus Deo, My Study Windows, The Last Leaf, Tampa Robins, The Blithedale Romance, Early Spring.

CIVICS

(Eighth grade)

Answer ten questions.

1. How does the Child Labor law govern the employment of children in Illinois?
2. What provisions are found in the U. S. Constitution in regard to the right to vote?
3. What are the voting qualifications in Illinois?
4. Explain how the President of the U. S. is elected.
5. How does a postman secure his position? What are some of the necessary qualifications?
6. Write the Preamble to the Constitution of the U. S.
7. In what particulars were the Articles of Confederation faulty?
8. When did the Constitution of the U. S. go into operation?
9. What is the purpose of a writ of Habeas Corpus?
10. How may a bill be passed over the President's veto?
11. State the duties of the County sheriff; the County Superintendent of Schools.
12. How many directors are there in school districts of less than 1,000 inhabitants?
13. What constitutes the Illinois Teachers' Examining Board? What are its duties?
14. State briefly the duties of the County Clerk.
15. What is minority or proportional representation? How is it used in Illinois?

CIVICS

(Eighth grade)

Answer ten questions:

1. What is a democracy? Name two. Compare our government to a ball team; explain an aristocracy through a ball team.
2. What does majority rule mean? Was it right for us to resist Britain in 1775? Why? Is a revolution ever dangerous?
3. Name five rights of American citizens. Name five duties of American citizens.

4. Where did we get our ideas of liberty? What was the Magna Charta?
5. Explain home rule in the United States. Who was responsible for the good or bad government?
6. Name the three branches of our government, and the representative of each.
7. Who may become president? What great law tells us this? Who is commander-in-chief of the army and navy?
8. When and where did the Constitution Convention meet? Who made the Constitution a power?
9. Write the Preamble to the Constitution.
10. Name five of the president's secretaries and tell who fills the offices.
11. Who makes treaties and issues passports? Who has charge of the mints? What is the difference between civil and political rights? When do our political rights begin?

CIVICS

(High school, 1st year)

1. What is an "unwritten constitution?" Give examples to show that we have one.
2. Name our colonial possessions and tell how each is governed.
3. Give qualifications and length of term for the President, a Senator, and a Representative.
4. What is meant by gerrymander, pocket veto, quorum pacifist, recall, neutral, arbitration?
5. Trace a bill through the process of becoming a law.
6. Of what does the Supreme Court consist? and what are its duties?

CIVICS

(High school)

Answer eight questions.

1. What differences did the framers of the constitution intend to create in the two houses?
2. What dangers are inherent in popular government?
3. "The federal government is one of limited power but within its own field it is supreme." Discuss.
4. What are the functions of the grand jury? Of the petit jury? What is a "hung" jury?
5. Discuss the origin of political parties in the United States. State the forces at work and the political leaders. Show how the different political parties, when in power, affect commerce and general prosperity of the nation.
6. Should we abandon our present electoral system? Give your reasons.
7. What is the difference between obeying a law and obeying a person?

8. Discuss metallic and paper money in the United States, stating the backing of each. Explain the European money market today on the basis of the above explanation.
9. What is the work of the National Committee?
10. What has the Washington Conference really accomplished?

GEOGRAPHY

(Seventh grade)

1. (a) Describe the formation of our continent.
   (b) Name the two great mountain systems and their smaller groups.
2. (a) Describe the size, shape and position of North America.
   (b) What was the extent of the Great Ice Sheet?
3. (a) Write an interesting paragraph about the Eskimos.
   (b) Name the New England States and give their capitals.
4. Describe the surface features, climate, rainfall and products of the Middle Atlantic States.
5. (a) Describe the mining of coal in the Middle Atlantic States.
   (b) Name the by-products of petroleum.
6. Name and describe the three chief industries of the Southern States.

PHYSICS

(High school)

Answer ten questions.

1. What is light? Cause of eclipse of moon? Show by drawing. Draw eclipse of sun.
2. Describe the rainbow. Show the formation in drawing. Show by drawing why the bow is curved.
3. What is heat? Temperature? Why does the boiling point vary?
4. What is the heat of fusion? Vaporization? How do these facts affect our life?
5. Describe a heating plant. Draw. (Either steam, water or air).
6. What is Probable Nature of Electrification? Theory of Lyden jar?
7. Describe a good open circuit battery and a good closed circuit battery.
8. Describe what you saw in X-ray.
9. How does a motor work? Describe the arc light. Incandescent.
10. Explain induction coil. Give practical uses of the coil. Give uses of transformer.
11. Describe either phone or telegraph in full.
12. Write 8 points either in favor or against the study of physics in high school.

ZOOLOGY

(High school)

Answer ten questions.

1. Name at least eight branches of the animal kingdom and an example of each class.
2. Discuss the classification of animals as to method used and basis for.
3. Explain how the amphibia stand between the fishes and the reptiles.
4. Give four illustrations showing how insects are adapted to their environment.
5. Why are the porifera a step higher than the protozoa?
6. Name an animal possessing one of the following:
   1. Alternation of generation.
   2. Bilateral symmetry.
   3. Complete metamorphoses
   4. Budding.
   5. Regeneration of lost parts.
7. Give an example to illustrate the struggle for existence and tell how the law of the survival of the fittest came to be established.
8. Why are the primates of such great importance?
9. What animal would you prefer to watch and study? Why?
10. Explain how Zoology helps you to realize the following objectives: 1. Health. 2. Vocation. 3. Use of leisure time.
11. What is your opinion as to the Theory of Evolution?

ARITHMETIC

(Eight grade)

Answer ten questions.

1. How much must I pay for U. S. 4¼% Liberty Bonds at 92, brokerage 1⅛, in order to have an annual income of $600?
2. How many blotters 6 inches long and 3½ inches wide can be cut without waste from a sheet of blotting paper 2 feet long and 14 inches wide?
3. What mathematical facts do the following numbers represent: 231, 7.92, 7000, 5280, 360, 62½, 31½, 32, 60, 16.
4. A baseball diamond, or infield, of regulation size for men is 90 ft. square. How long is a straight throw from first base to third?
5. Extract the cube root of 5832 and 148877.
6. Draw a figure to represent a section of land. (a) Number correctly the sections. (b) In a smaller drawing show the N. E. ¼ of the S. E. ¼ of Sec. 16.
7. Define mensuration, plane surface, rectangle, trapezoid, parallelogram.
8. How find the area of a parallelogram? How many square feet in a building lot 125 feet long and 50 ft. wide?
9. How many acres of land in a road 10 mi. long and 4 rods wide? What is the land in this road worth if land sells at $300 per acre?

10. Define circle, diameter, radius, circumference.

12. A boy measured the distance around a tree and found it to be 6¼ ft. How thick is the tree, correct to the nearest inch, where he made the measurement?

13. What is the lateral surface of a cylinder 15 inches high and 10 inches in diameter? What is its entire surface?

14. A silo (cylindrical) is 12 ft. in diameter and is filled to a depth of 18 ft. How many cubic feet of silage does it contain?

15. Define sphere, area of sphere, volume of a sphere. Considering the earth a sphere whose radius is 4000 mi., find the area of the earth's surface. Its volume.

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